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TRADE NAME	MODEL	SET AND FOLDER NO.
Admiral	12X11, 12X12 (Ch. 20Z1), 20X11, 20X12, 20X122 (Ch. 20X1), 20X136, 20X145, 20X146, 20X147 (Ch. 20Y1), 22X12, 22X25, 22X26, 22X27 (Ch. 20Z1), 24A125AN (Ch. 20X1), 24X15, 24X15S, 24X16, 24X16S, 24X17S (Ch. 20X1 & Radio Ch. 4L1), 32X15, 32X16 (Ch. 20Z1 & Radio Ch. 4S1), 32X26, 32X27, 32X35, 32X36 (Ch. 20Z1 & Radio Ch. 5B2) Tel. Rec.	100-1
Aircastle	PM-78	100-2
Airline	05WG-2752	100-3
Arvin	350-PB, 350-PL, 351-PB, 351-PL, 352-PL, 353-PL (Ch. RE-267-1, RE-267-2)	100-4
Dewald	D-518	100-5
Dewald	DT-120, DT-122, DT-161, DT-162, DT-162L, DT-163, DT-1020, DT-1020A, DT-1030, DT-1030A, DT-X-160 Tel. Rec.	100-6
Motorola	5J1, 5J1U, 5L1, 5L1U (Ch. HS-224, HS-250)	100-7
Motorola	700	100-8
Operadio	4A35, 4A55	100-9
Rauland	1820	100-10
Sentinel	412, 413, 414, 415 (Series YA, YB, YC, YD, YE, YF) Tel. Rec.	100-11
Webster	346 Record Changer	100-12
Westinghouse	H-307T7, H-308T7 (Ch. V-2136)	100-13
Westinghouse	H-603C12, H-608C12 (Ch. V-2152-01 & V-2149-3) Tel. Rec.	100-14

The PHOTOFACT Servicer

July 1, 1950 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ Vol. No. 10, Nos. 99 & 100

I. C. Darby RADIO SERVICE
300 W. FOURTH ST.
PHONE 4402
Carthage, Missouri

May 12, 1950

Mr. Howard W. Sams & Co.,
Indianapolis, Indiana

Dear Sirs: -

"A Century of Progress in a few short years," should be a fitting title for Sams' Photofact Folder Set No. 100 coming soon.

I believe that every serviceman who has a complete file of the 100 Folder Sets should join in some kind of celebration honoring your vision and courage in launching this enterprise.

At any rate, please accept my congratulations for a job well done, when No. 100 rolls off the press - and my order is in for it. In fact, I looked over the first Photofact Folder and placed a standing order with Mr. M. Brotherson, of Joplin, Mo., my jobber, for the Folders as they were available. Many thanks for your valuable assistance in my work.

Very truly,

I. C. Darby Radio Service

By: I. C. Darby.

Martin Codel's TELEVISION DIGEST Issue of May 17 reports as follows:

"Number of TV stations rose gradually from 49 to 97 during 1949 - - now is 105 . . . may be 108 by year's end. Network service reached only 16 areas at start of 1949 - - now reaches 33 areas . . is gradually expanding to others".

* * *

WE'LL PAY $5.00 FOR YOUR IDEAS ON NEW WAYS TO USE PHOTOFACT FOLDERS

Have you found some novel way of putting your PHOTOFACT Folders to work so you get extra value and help from them? Tell us about it, and if the idea is good enough to pass on to thousands of your fellow PHOTOFACT subscribers, we'll print it in the "SERVICER" and send you a crisp $5.00 check. Here are two practical suggestions we've received that were each worth $5.00:

"Here is one of the many reasons I like 'PHOTOFACT' Folders. I can use this system every time - - not just three out of five times.

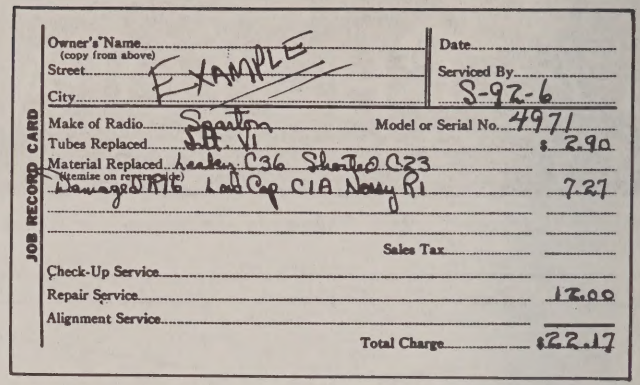
"On the small 3 x 5 Job Record Cards I use, there was never enough room in the 'Material Replaced' section for the reason and identification of parts replaced until I started using PHOTOFACTS. Now, I use one word for the reason and the 'Item No.' for identification. At the top of the card, in a blank space, I put 'S' (for Sams) - 92-6, for example, for Sparton Model 4971 radio. This system could be used either with Job Record Cards or Work Log Book and save a lot of writing and time. If the set came back, either for a routine check or further trouble, you have all the information in a few words.

"Thanking all of you at the Howard W. Sams Co. for all the time and headaches you have saved me since I first started using 'PHOTOFACTS', and hoping you will keep up the good work, I am"

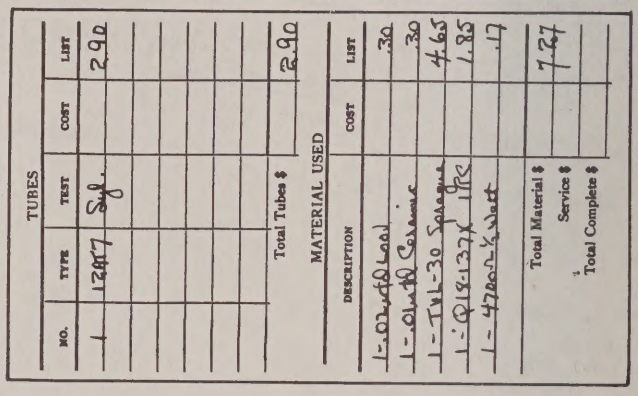
David T. Drage
Radio & Electronic Service
Bethania, North Carolina

* * *

"To assist me in making efficient use of your Service Hints, as published in


JOB RECORD CARD

Owner's Name (copy from above) EXAMPLE
Street
City
Date
Serviced By S-92-6
Make of Radio Sparton Model or Serial No. 4971
Tubes Replaced 6BE, V1 $ 2.90
Material Replaced (Itemize on reverse side) leaker C36 Short C23 Damage R16 Lock Cap C1A Noisy P1 7.27
Sales Tax
Check-Up Service
Repair Service 12.00
Alignment Service
Total Charge $22.17


TUBES

NO.	TYPE	TEST	COST	LIST
1	12A7	Syl.		2.90
			Total Tubes $	2.90

MATERIAL USED

DESCRIPTION	COST	LIST
1-.02 ufd 600 Load		.30
1-.01 mfd Ceramic		.30
1-TVL-30 Sprague		4.65
1-GR-1337 1 Pk		1.85
1-47 ohm ½ watt		.17
	Total Material $	7.27
	Service $	
	Total Complete $	

the PHOTOFACT Servicer, I have a set of file cards for each manufacturer, separating Radio and TV into different compartments. I indicate on each card the model of the receiver and where it can be found in the Servicer, thus helping me to locate the service hint in a matter of moments. Since a great many of the faults are peculiar to certain models of receivers, I always check through my file system to see if someone has sent the symptoms and Service Hint to you. I have had numerous jobs where your Service Hints were a life-saver in locating the trouble, thus saving me many hours of servicing had I not made use of them.

"A great many servicemen detest writing letters on their findings - - I find that it pays off in more ways than one. It helps me to be more efficient and it probably helps some serviceman - new to TV or radio - to locate trouble more quickly in a particular receiver.

"Keep publishing those Service Hints! !"

Horace D. Westbrooks
Radio Technician
117 West Solomon Street
Griffin, Georgia

Got a hint or kink to match these - - some other ingenious way in which you use PHOTOFACT Folders? Send in your ideas - - they may be worth $5.00 each.

Start 'em coming!

Address your letters to HOWARD SAMS, c/o PHOTOFACT Servicer.

* * *

FIELD EXPERIENCES

For every "Field Experience" published, we issue a certificate good for one PHOTOFACT Folder Set. Awards are issued at the time of publication. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Co., Inc.

* * *

Added Convenience In Use of Tube Tester In the Home!

Many, many times I have found myself crouching in cramped quarters behind a console radio in my customer's living room, using my tube tester on the floor. The reason - - tube tester power cord too short to place the instrument in a convenient location. The solution - - I replaced the 6 ft. cord with a 15 ft. cord, most of which I leave folded up, held with a rubber band, and tucked in the bottom of the compartment of my portable tube checker until it is needed. The cost is small, and the added convenience is considerable.

Edgar I. Allred
Edgar Allred's Radio Shop
82 W. 1 No.
Logan, Utah

* * *

MOTOROLA Model VT73
Photofact Set No. 71, Folder No. 12

Complaint: Sound weak, screen blank. All DC voltages were below normal. After checking seleniums and filters, we found abnormal current drain in all circuits. This led to a check of AC voltage drop across the heaters. They were about 20% above normal. The ballast the tube (Part #17A485459) had changed value in both sections, raising supply to heater string.

Remedy: Replace with new ballast tube.

Chas. R. Miller
McNaughton's Radios & Appliances
1216 Main Street
Milwaukie, Oregon

* * *

PHILCO Model 49-1075 TV

Complaint: Radio and Phono dead; set smokes; TV Okay.

Remedy: Do not dive into filters; first, remove metal screw which holds selenium rectifier to chassis.

PHILCO Model 49-1606,07
Photofact Set No. 53, Folder No. 19

Complaint: Grounds to chassis through eyelet rivet which holds rectifier plates together.

Remedy: Replace defective unit with a 100 mil unit and replace the 10-watt resistors which have burned up; set will then be Okay.

Editor's Note: Both Field Experiences listed above were contributed by:

Ervin F. Bauer
4764 Eichelberger
St. Louis, Missouri

* * *

MOTOROLA Models VK101, VT101, VF102
(Chassis TS-5)
Photofact Set No. 51, Folder No. 14

Complaint: Top portion of picture partially cut off and reduced to nearly half size. This condition may be intermittent and seems to indicate trouble in the vertical oscillator and output circuits.

Cause and Remedy: 2nd video amplifier 6AC7 (V-9) internally shorted or leaking. Replace with new 6AC7.

PHILCO Model 50T-1403TV

Complaint: Very noisy when channel switching or using the fine-tuning control. The front end of this model is in a can and has supporting brackets "floating" on rubber grommets.

Remedy: I found that by grounding these two brackets to the chassis with copper strips, the intermittent noise was eliminated. Evidently, since the front end is rf "hot", a static charge

is built up on the brackets, discharging to the chassis and/or rf head, when the position of rf head is changed in relation to the brackets or rf can.

Editor's Note: Both Field Experiences listed above were contributed by:

Horace D. Westbrooks
117 W. Solomon Street
Griffin, Georgia

* * *

GENERAL ELECTRIC Model 10T1 TV
Photofact Set No. 96, Folder No. 4

Complaint: No sound, picture or raster. Tubes all light up.

Cause and Remedy: Failure of low-voltage power pack due to a 7-Watt, 10-Ohm resistor in series with one side of line. Replace with a wire-wound 10-Watt, 10-Ohm resistor. On some models this was a 4.6-Ohm resistor.

MOTOROLA Model 12VT13R
Photofact Set No. 92, Folder No. 4

Complaint: Picture gets dark and blurred; raster too small in height and width. Sound may have a bad frying noise; there may be a bad odor.

Remedy: Replace selenium rectifier - - the one which connects to the field coil. Voltages will be low - about 190 instead of 260. Rectifier goes bad. No other trouble.

Editor's Note: Both Field Experiences listed above were contributed by:

Arthur E. Dibble
Radio Repair, Sales and Service
New Albany, Pennsylvania

* * *

TRUETONE Model 2047 (Early)

Complaint: No high voltage; or erratic high voltage.

Remedy: Replace the 10-mfd., 150-volt damper filter condenser.

Note: Although it checks Okay, we found that it will break down in operation.

W. M. Bohne
Werner's
20 Court Street
Binghamton, New York

CROSLEY Model 56TP-L
Photofact Set No. 8, Folder No. 5

Complaint: In this set, after playing from 10-15 minutes, it was found that the volume would go down to almost no sound and then come back on slowly.

Cause and Remedy: After spending some time on testing of tubes and set, I still had no results. Then I heated each tube for five minutes in tube tester and found that the 50A5 finally did show shorted elements. Replaced 50A5 and set was Okay.

Ralph F. Miller
Miller's Radio Shop
Flat Rock, Illinois

* * *

MOTOROLA Model VT107 TV
Photofact Set No. 67, Folder No. 13

Complaint: No raster.

Cause and Remedy: If by removing tube V8 from socket raster is normal, check resistor R46 for open circuit.

Bert Wehmeyer
c/o Cain's Music & Appliance
Brentwood, Missouri

* * *

RCA Model T-164,
Chassis KCS-4CA

Note: The same or similar chassis is used in several different RCA models and this applies to any one of these television receivers with provision for phonograph.

Complaint: Intermittent and non-operating sound.

Cause: The phono jack and switch are placed on the chassis close to the long power resistor and apparently when the chassis gets warm, enough heat is generated to cause the metal work to expand causing a short in the phone switch.

Remedy: Remove switch and plug cover, bend contacts away from cover and insulate the inner surface of this shield with electrical tape.

Editor's Note: The above field experience submitted by field service section of Howard W. Sams & Co., Inc.

PHOTOFACT* Folder

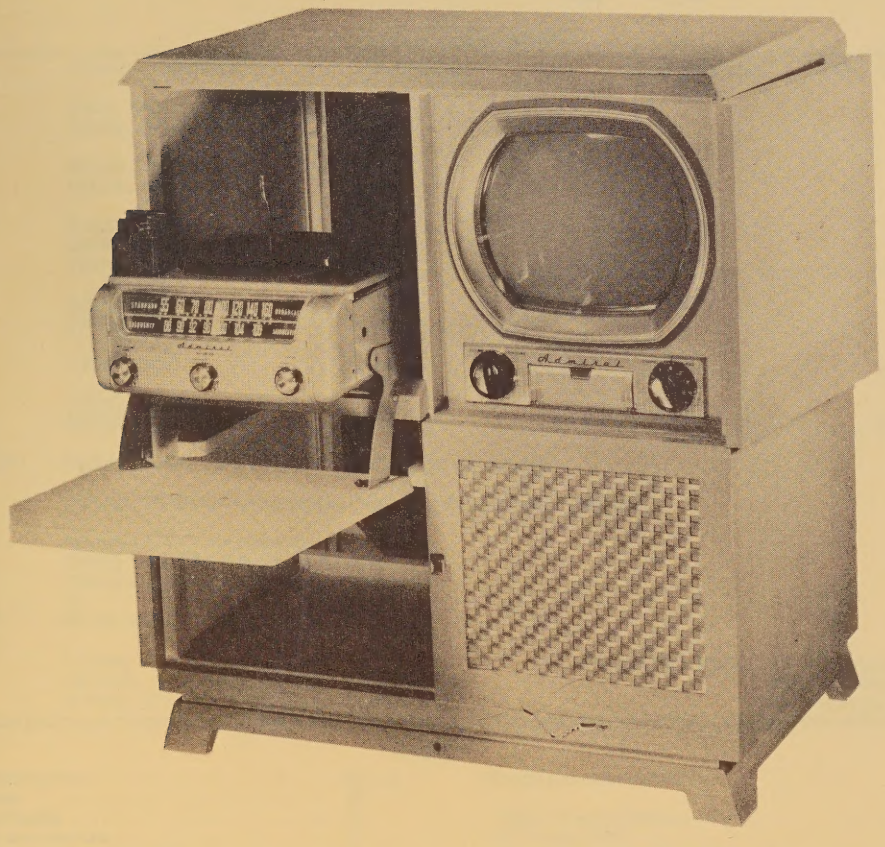
*TRADE MARK

ADMIRAL CHASSIS
20Z1, 20X1, 20Y1 AND RADIO CH. 4L1, 4S1, 5B2

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 32X27

ADMIRAL CHASSIS
20Z1, 20X1, 20Y1 AND RADIO
CH. 4L1, 4S1, 5B2

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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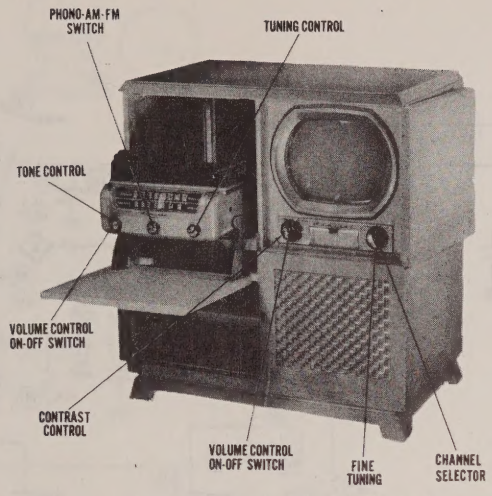
Date 7/50 Set No. 100—Folder No. 1

PHOTOFACT* Folder
*TRADE MARK

ADMIRAL CHASSIS 20X1, 20Y1, 20Z1, RADIO CHASSIS 4L1, 4S1, 5B2



ADMIRAL MODEL 32X27

TRADE NAME	ADMIRAL MODELS	TV CHASSIS	RADIO CHASSIS	PWR. SUPPLY CHASSIS
	20X11, 20X12, 20X122, 24A125AN	20X1		
	20X136, 20X145, 20X146, 20X147	20Y1		
	24X15, 24X15S, 24X16, 24X16S, 24X17S	20X1	4L1	1PA1
	12X11, 12X12, 22X12, 22X25, 22X26, 22X27	20Z1		
	32X15, 32X16	20Z1	4S1	1PA2
	32X26, 32X27, 32X35, 32X36	20Z1	5B2	2PA1

MANUFACTURER	Admiral Corp., 3800 Cortland St., Chicago 47, Illinois		
TYPE SET	FM-AM-TV-Phono Combination Receiver (Some models "TV" only)		
TUBES	Nineteen ("TV" only models) Twenty Four (TV-AM-Phono models) Twenty Six (TV-AM-FM-Phono models)		
POWER SUPPLY	110-120 Volts AC-60 Cycle		
RATINGS	1.7 Amp. at 117 Volts AC (TV) .65 Amp. at 117 Volts AC (Radio Chassis 5B2) .5 Amp. at 117 Volts AC (Radio Chassis 4S1)	TUNING RANGES	TV Channels 2 thru 13 AM 540-1620KC FM 88-108MC

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THIS SERVICE INFORMATION SUPERCEDES PRELIMINARY SERVICE DATA PREVIOUSLY ISSUED ON THESE MODELS.

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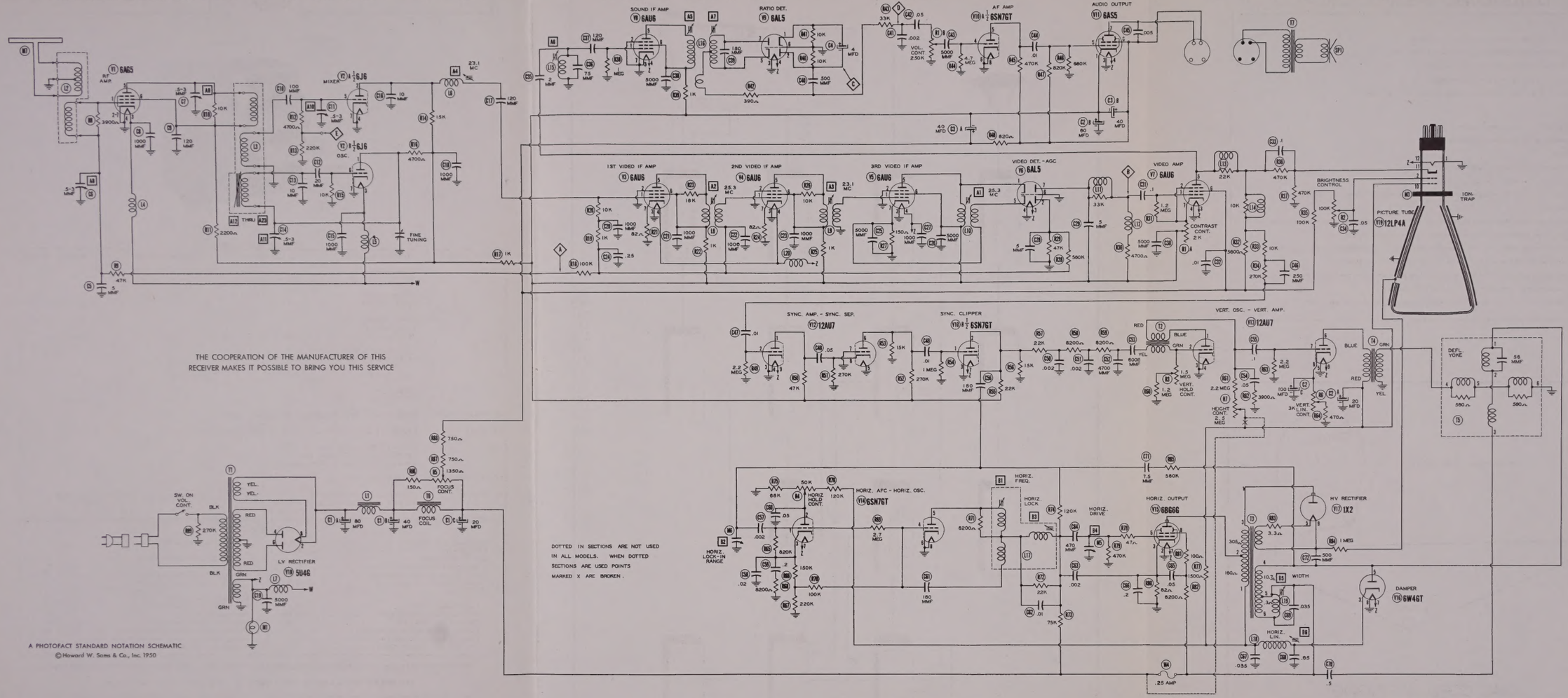
DATE 7-50 SET 100 FOLDER 1

ADMIRAL CHASSIS 20X1, 20Y1, 20Z1, RADIO CHASSIS 4L1, 4S1, 5B2



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

DOTTED IN SECTIONS ARE NOT USED IN ALL MODELS. WHEN DOTTED SECTIONS ARE USED POINTS MARKED X ARE BROKEN.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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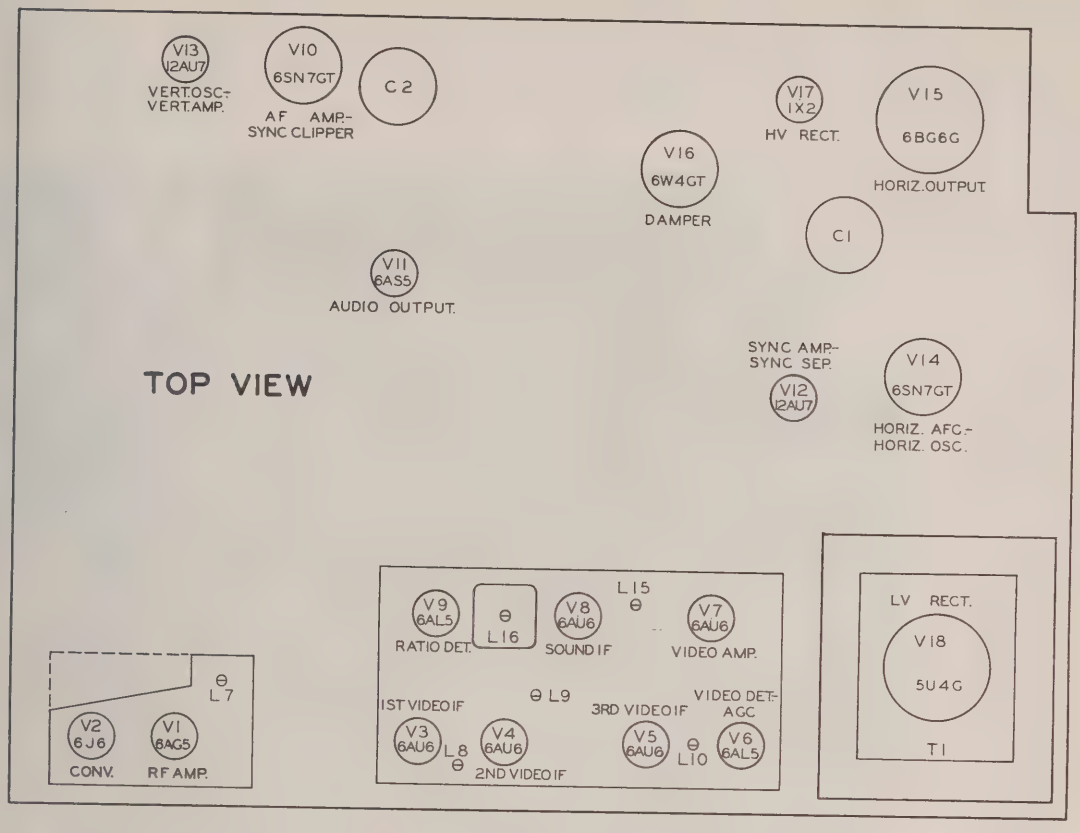
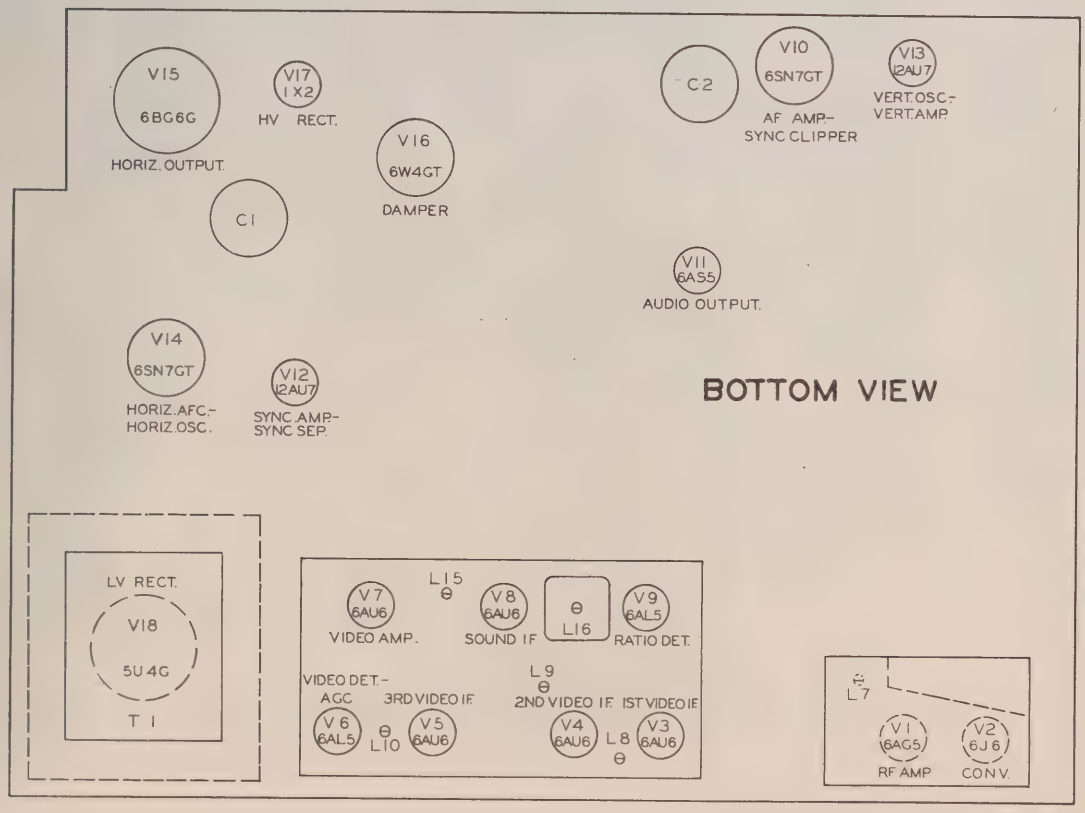
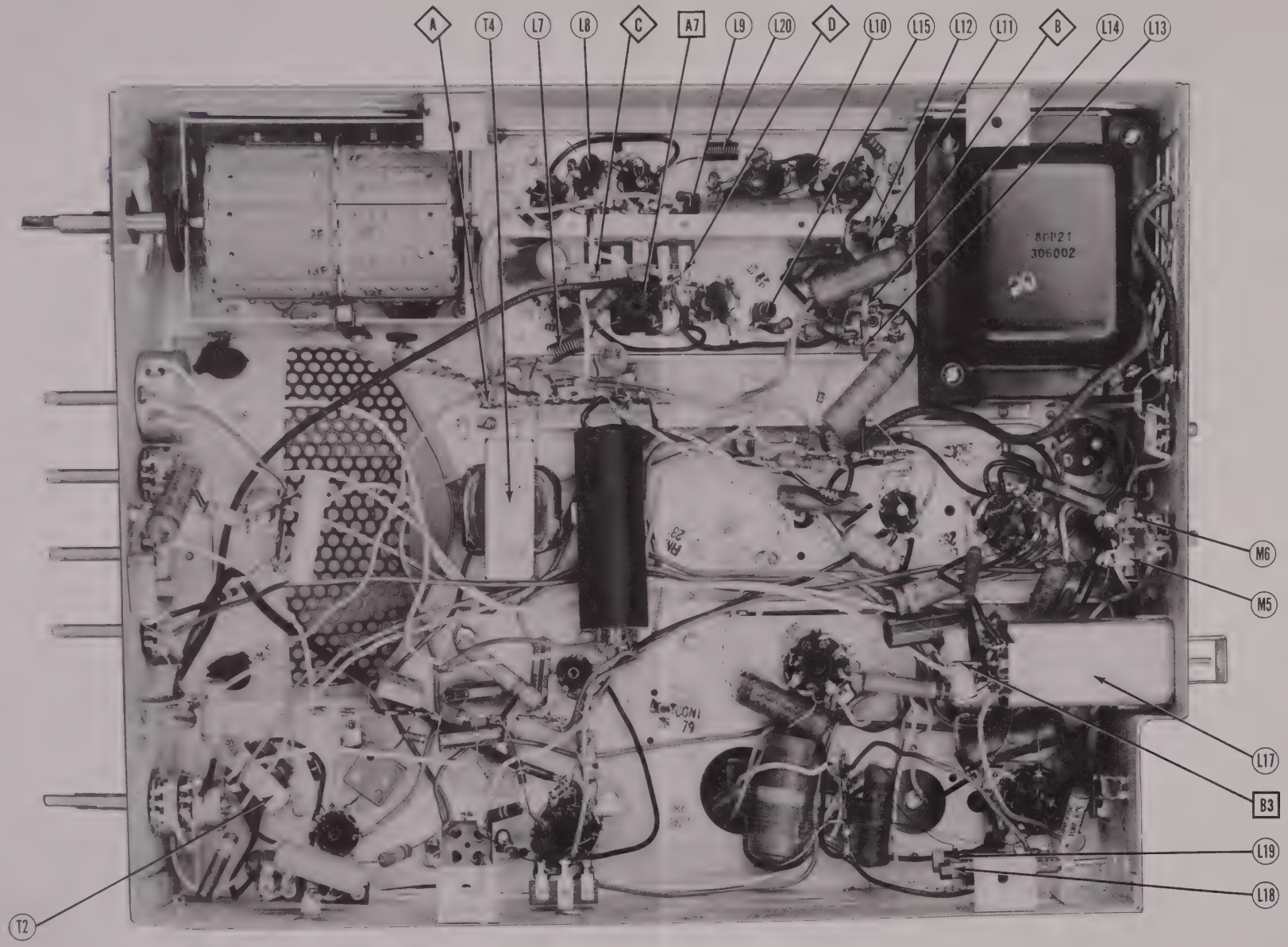
ADMIRAL CHASSIS 20X1, 20Y1, 20Z1, RADIO CHASSIS 4L1, 4S1, 5B2

ADMIRAL CHASSIS 20X1, 20Y1, 20Z1, RADIO CHASSIS 4L1, 4S1, 5B2





TUBE PLACEMENT CHART



TV CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

CHASSIS TOP VIEW

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V14) from its socket.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace it with a 6J6 which has pin 1 removed. This will prevent erroneous indications caused by the local oscillator.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over converter tube (V2). Low side to chassis.	25.3MC (Unmod.)	Any	DC Probe to Point (A). Low side to chassis.	A1, A2	Adjust for maximum deflection. Attenuate signal generator to maintain 1 volt reading.
2.	Direct	"	23.1MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
Connect a 10KΩ resistor in series with the oscilloscope vertical input lead, and a 330MMF capacitor across the end of the vertical input cable.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to ungrounded tube shield floating over converter tube (V2). Low side to chassis.	24MC (10MC SWP)	21.25MC 24.3MC 25.75MC	Any	Vert. Amp. to Point (B). Low side to chassis.		Check for response curve similar to figure 1. If necessary retouch A1 thru A4 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Turn the contrast control to maximum clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V7). Low side to chassis.	4.5MC (Unmod.)	Any	DC Probe to Point (C). Common to chassis.	A5, A6	Adjust for maximum deflection. Attenuate signal generator to maintain 1 volt reading.
5.	.01MFD	"	"	"	DC Probe to Point (D). Common to chassis.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.
Turn the contrast control to maximum clockwise.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V7). Low side to chassis.	4.5MC (450KC Sweep)	4.5MC	Any	Vert. Amp. to Point (C). Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C4. Adjust for maximum amplitude and symmetry as per figure 2.
5.	.01MFD	"	"	"	"	Vert. Amp. to Point (D). Low side to chassis.	A7	Reconnect capacitor C4. Adjust A7 so 4.5MC occurs at center of crossover lines as per figure 3. Slightly retouch A6 for maximum amplitude and straightness of crossover lines.

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
Connect the negative lead of a 1 1/2 volt battery to Point A , connect the positive lead to chassis.
Keep the output of the sweep generator and marker generator as low as possible to prevent overloading the circuits.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	207MC (10MC SWP)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to Point (E). Low side to chassis.	A8, A9, A10	Adjust for response curve similar to figure 4 with markers as shown.
7.	"	"	213MC (10MC SWP)	211.25MC 215.75MC	13	"		Check for response similar to figure 4. If markers fall below 80% on any channel, mark slight adjustment of A8, A9 and A10 with channel selector set for that channel. Recheck all channels to see that they have not been seriously effected.
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			
			85MC (10MC SWP)	83.25MC 87.75MC	6			
			79MC (10MC SWP)	77.25MC 81.75MC	5			
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

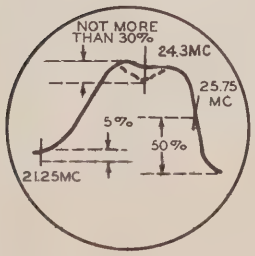


FIG.1

FIG. 2

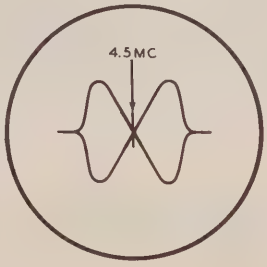


FIG. 3

FIG.4

TV ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using All. It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel. If adjust of All will not bring all channels within the range of the fine tuning control, it will be necessary to adjust the individual channel oscillator adjustment for each channel oscillator adjustment for each channel that is off frequency. The individual channel oscillator screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

Set the fine tuning control to the mid-position of its range.

Connect the negative lead of a 3 volt battery to Point A , connect the positive lead to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. Amp. to Point (B). Low side to chassis.	A12	Adjust to place sound marker as shown in figure 5. The video marker should be at 50%.
			207MC (10MC SWP)	205.25MC 209.75MC	12		A13	
			201MC (10MC SWP)	199.25MC 203.75MC	11		A14	
			195MC (10MC SWP)	193.25MC 197.75MC	10		A15	
			189MC (10MC SWP)	187.25MC 191.75MC	9		A16	
			183MC (10MC SWP)	181.25MC 185.75MC	8		A17	
			177MC (10MC SWP)	175.25MC 179.75MC	7		A18	
			85MC (10MC SWP)	83.25MC 87.75MC	6		A19	
			79MC (10MC SWP)	77.25MC 81.75MC	5		A20	
			69MC (10MC SWP)	67.25MC 71.75MC	4		A21	
			63MC (10MC SWP)	61.25MC 65.75MC	3		A22	
			57MC (10MC SWP)	55.25MC 59.75MC	2		A23	

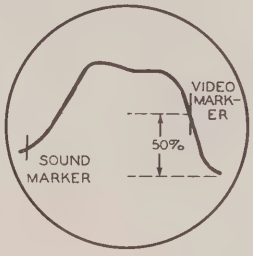


FIG.5

RADIO CHASSIS 4LI AND 4SI ALIGNMENT

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer to last reference mark at low frequency end of dial.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
9.	.1MFD	High side to stator on "AM" antenna section of tuning gang. Low side to chassis.	455KC (400 ∿ Mod.)	Not used	Tuning gang fully open	Across voice coil	A24, A25, A26, A27	Adjust for maximum output.
10.	REPLACE SET IN CABINET AND CONNECT THE LOOP ANTENNA.							
11.		Loop	1620KC	"	Tuning gang fully open	Across voice coil	A28	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
12.		Loop	1400KC	"	Tune for max. output	"	A29	"

RADIO CHASSIS 5B2 ALIGNMENT

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
13.	.1MFD	High side to stator on "AM" antenna section of tuning gang. Low side to chassis.	455KC (400 ∿ Mod.)	AM (center)	Tuning gang fully open	Across voice coil	A30, A31, A32, A33	Adjust for maximum output.
14.	.1MFD	"	1620KC	"	"	"	A34	"
15.		Loop	1400KC	"	Tune for max. output	"	A35	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Retouch A35 after set is replaced in cabinet.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
16.	.001MFD	High side to pin 1 (Grid) of 6BA6 (V22). Low side to chassis.	10.7MC (Unmod.)	FM (CW)	Tuning gang fully open	DC Probe to Point (F). Common to chassis.	A36	Adjust for maximum deflection. Attenuate signal generator to maintain 1.5 volt reading.
17.	.001MFD	High side to pin 1 (Grid) of 6BA6 (V21). Low side to chassis.	"	"	"	"	A37, A38	"
18.	Direct	Across "FM" antenna terminals.	"	"	"	"	A39, A40	"
19.	Adjust signal generator to output until VTVM reads EXACTLY 1.5 volt.							
20.	Tune signal generator above 10.7MC until VTVM reads EXACTLY 1 volt. Note exact frequency.							
21.	Tune signal generator below 10.7MC until VTVM reads EXACTLY 1 volt. Note exact frequency.							
22.	Add the frequencies obtained in steps 20 and 21 and divide their sum by 2. The result is the center frequency of the IF response curve.							
23.	Tune the signal generator above and below 10.7MC and note the VTVM reading at different frequency points until you have a good impression of the shape of the selectivity curve. If two peaks are obtained, note the difference of both peaks on the VTVM. If one peak exceeds 20% of the other, realignment of the IF's is necessary.							

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
24.	Direct	Across "FM" antenna terminals.	Set to mid frequency obtained in step 22.	FM	Tuning gang fully open	DC Probe to Point (G). Low side to chassis.	A41	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
16.	Direct	Across "FM" antenna terminals.	10.7MC (450KC Sweep)	FM (CW)	Tuning gang fully open	Vert. Amp. to Point (H). Low side to chassis.	A37, A38, A39, A40	Adjust for maximum amplitude and symmetry as per figure 6.
17.	Direct	"	"	"	"	Vert. Amp. to Point (G). Low side to chassis.	A36, A41	Adjust A41 so 10.7MC occurs at center of crossover lines as per figure 7. Adjust A36 for maximum amplitude and straightness of crossover lines. Continue with step 25.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
25.	Two 120Ω carbon res.	Across FM Antenna terminals with 120Ω in each lead.	109MC (Unmod.)	FM	Tuning gang fully open	DC Probe to Point (H). Common to chassis.	A42, A43	Adjust for maximum deflection.
26.	"	"	87MC	"	Tune for max. signal	"		If the signals in steps 25 and 26 do not tune near the extremes of the tuning gang, expand or compress the oscillator coil turns and repeat steps 25 and 26.
27.	"	"	106MC	"	"	"	A43	Readjustment for maximum deflection. Check calibration at 90MC. If necessary expand or compress antenna coil turns. Repeat steps 25, 26 and 27 if antenna coil is changed.

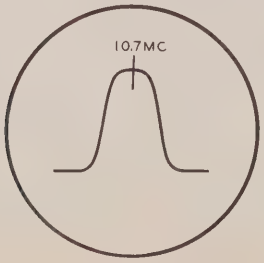


FIG. 6

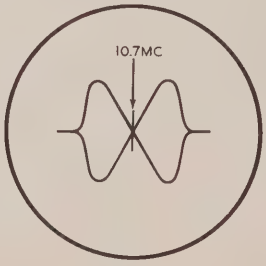


FIG. 7

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-.1VDC	0V.	6.3VAC	0V.	115VDC	115VDC	0V.		
V 2	6J6	80VDC	90VDC	6.3VAC	0V.	-1.4VDC	§-1.7VDC	0V.		
V 3	6AU6	-2.8VDC	0V.	0V.	6.3VAC	130VDC	130VDC	.7VDC		
V 4	6AU6	-.6VDC	0V.	0V.	6.3VAC	130VDC	130VDC	.7VDC		
V 5	6AU6	0V.	0V.	0V.	6.3VAC	140VDC	140VDC	1.2VDC		
V 6	6AL5	140VDC	-.2VDC	6.3VAC	0V.	1.2VDC	0V.	135VDC		
V 7	6AU6	†.7VDC	†28VDC	6.3VAC	0V.	†120VDC	†180VDC	†28VDC		
V 8	6AU6	-2VDC	0V.	0V.	6.3VAC	125VDC	125VDC	0V.		
V 9	6AL5	.2VDC	-.2VDC	0V.	6.3VAC	-.1VDC	0V.	-.1VDC		
V 10	6SN7GT	-1VDC	38VDC	0V.	-.7VDC	20VDC	0V.	6.3VAC	0V.	
V 11	6AS5	†0V.	†-7.8VDC	0V.	6.3VAC	†-7.8VDC	†140VDC	†130VDC		
V 12	12AU7	37VDC	-1.6VDC	0V.	0V.	0V.	6.2VDC	0V.	2.2VDC	6.3VAC
V 13	12AU7	148VDC 80VDC	-16VDC	0V.	0V.	0V.	380VDC	0V.	9.2VDC 27.5VDC	6.3VAC
V 14	6SN7GT	-3.1VDC	100VDC	-18VDC	-55VDC	190VDC	0V.	6.3VAC	0V.	
V 15	6BG6G	-.5VDC	0V.	9.6VDC	0V.	-.5VDC	190VDC	6.3VAC	260VDC	TOP CAP *
V 16	6W4GT	0V.	0V.	410VDC	350VDC	350VDC	350VDC	6.3VAC	0V.	
V 17	1X2	* DO NOT MEASURE.								
V 18	5U4G	0V.	410VDC	0V.	365VAC	0V.	365VAC	0V.	410VDC	
V 19	12LP4A	0V.	0V.	PIN 10 400VDC	PIN 11 115VDC	PIN 12 6.3VAC				

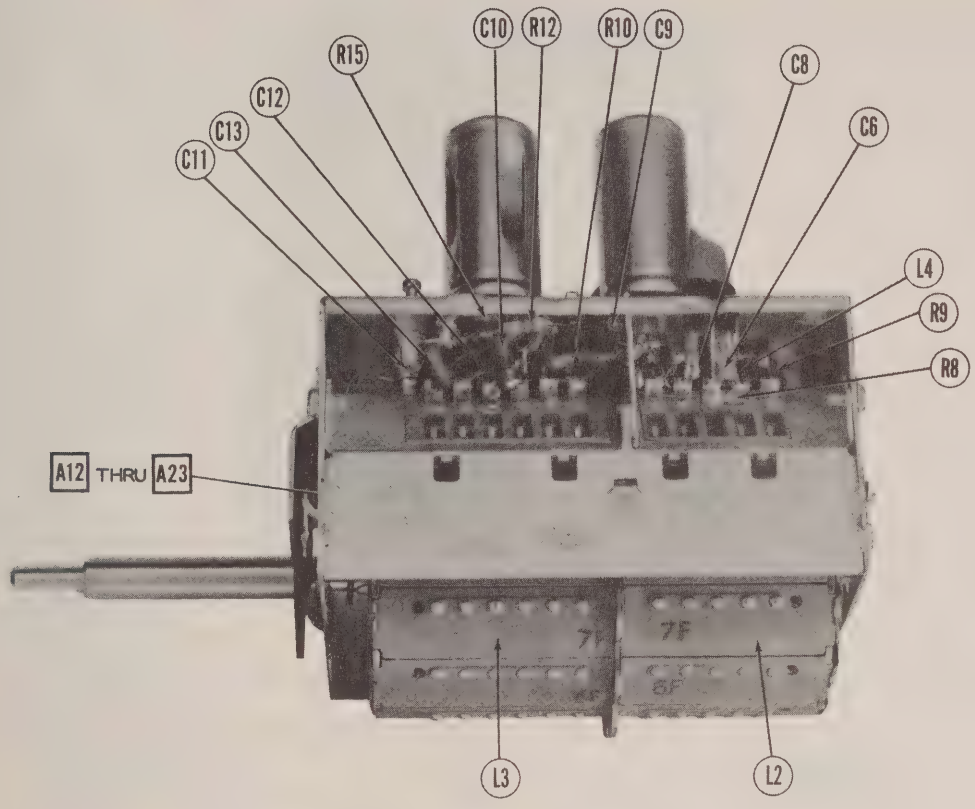
§ TAKEN WITH VACUUM TUBE VOLTMETER.
* DO NOT MEASURE.
† MEASURED FROM PIN 1 OF V11.

RESISTANCE READINGS

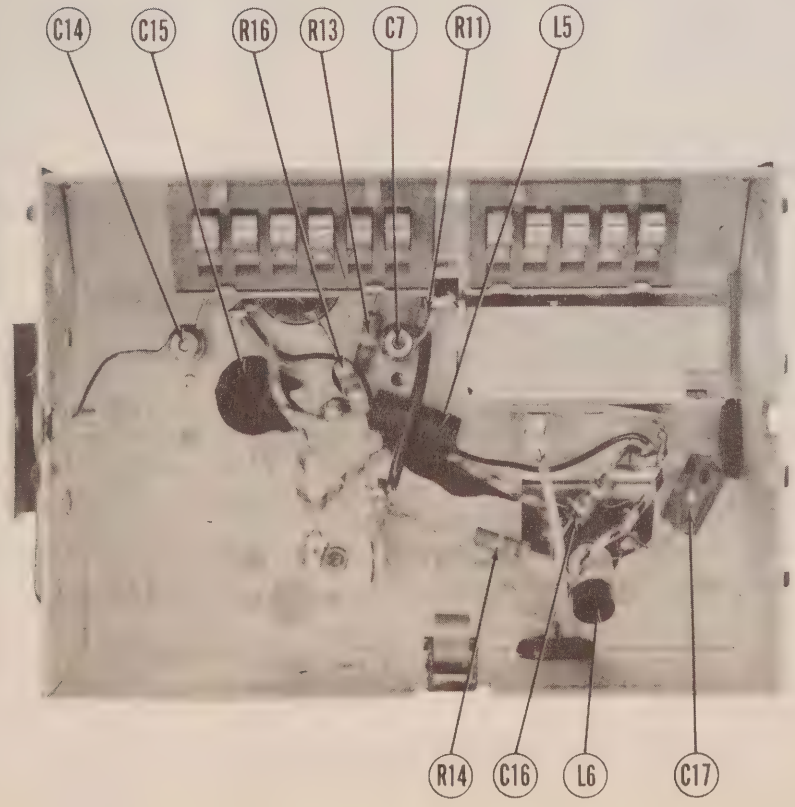
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	750KΩ	0Ω	.1Ω	0Ω	†3.2KΩ	†3.2KΩ	0Ω		
V 2	6J6	†5.7KΩ	†16KΩ	.1Ω	0Ω	225KΩ	10KΩ	0Ω		
V 3	6AU6	610KΩ	0Ω	0Ω	.1Ω	†1000Ω	†1000Ω	82Ω		
V 4	6AU6	600KΩ	0Ω	0Ω	.1Ω	†1000Ω	†1000Ω	82Ω		
V 5	6AU6	.3Ω	0Ω	0Ω	.1Ω	†.3Ω	†0Ω	150Ω		
V 6	6AL5	†.3Ω	47KΩ	.1Ω	0Ω	150Ω	0Ω	†4.7KΩ		
V 7	6AU6	†1.2 Meg.	†2000Ω	.1Ω	0Ω	▲7KΩ	▲1000Ω	†2000Ω		
V 8	6AU6	1 Meg.	0Ω	0Ω	.1Ω	†1000Ω	†1000Ω	0Ω		
V 9	6AL5	10KΩ	10KΩ	0Ω	.1Ω	Inf.	0Ω	Inf.		
V 10	6SN7GT	1 Meg.	15KΩ	0Ω	4.7 Meg.	▲470KΩ	0Ω	.1Ω	0Ω	
V 11	6AS5	†0Ω	400KΩ	0Ω	.1Ω	400KΩ	▲2000Ω	▲2.2KΩ		
V 12	12AU7	†47KΩ	2.2 Meg.	0Ω	0Ω	0Ω	15KΩ	0Ω	270KΩ	.1Ω
V 13	12AU7	#2 Meg. #4.5 Meg.	2.7 Meg.	0Ω	0Ω	0Ω	#2000Ω	2.2 Meg.	3.4KΩ 470Ω	.1Ω
V 14	6SN7GT	1 Meg.	#200KΩ	370KΩ	340KΩ	▲75KΩ	0Ω	.1Ω	0Ω	
V 15	6BG6G	470KΩ	0Ω	82Ω	300KΩ	470KΩ	▲75KΩ	.1Ω	▲8.3KΩ	TOP CAP #200Ω
V 16	6W4GT	Inf.	8.2KΩ	#0Ω	▲300Ω	▲310Ω	▲300Ω	.1Ω	0Ω	
V 17	1X2	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf. TOP CAP #450Ω
V 18	5U4G	Inf.	45KΩ	Inf.	38Ω	Inf.	38Ω	Inf.	45KΩ	
V 19	12LP4A	0Ω	13Ω	PIN 10 #1.5KΩ	PIN 11 250KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 1 OF V11.
▲ MEASURED FROM PIN 2 OF V18.
MEASURED FROM PIN 3 OF V16.

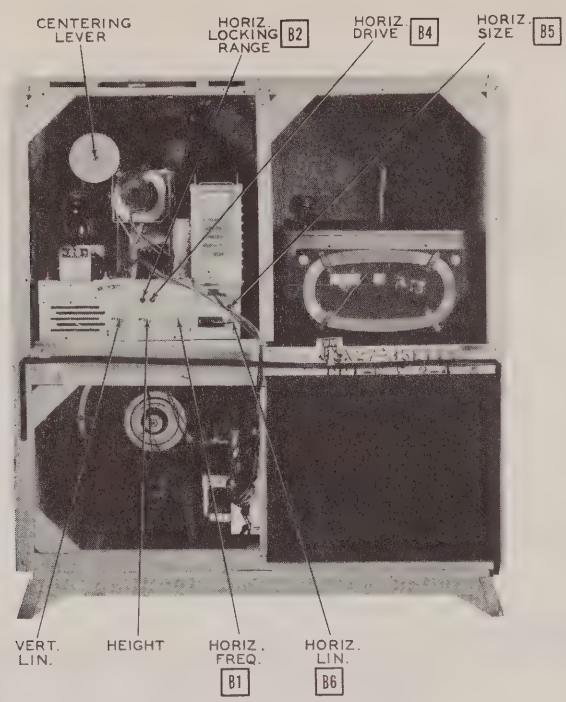
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



TV RF TUNER-RIGHT SIDE



TV RF TUNER-BOTTOM VIEW



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR CHECK

a) Turn the set on and tune in a TV station, preferably a test pattern, and allow a few minutes warmup.
b) Turn the horizontal hold control to fully counter-clockwise. The picture should remain in horizontal sync.
c) Momentarily interrupt the signal by switching to another channel and back again. The picture will normally be out of sync.
d) Slowly rotate the horizontal hold control clockwise and carefully note the number of bars just before the picture pulls into synchronization. There should be 3 to 4 bars just before pull in.
e) The picture should pull into sync after approximately 90° of clockwise rotation and should remain in sync for approximately 90° additional clockwise rotation. At the extreme clockwise position the picture should be out of sync and show a single vertical or diagonal bar in the raster.

SLIGHT RETOUCH ADJUSTMENT

If the receiver failed the above check, proceed with slight retouch adjustment as follows:
1) Turn the horizontal hold control fully clockwise.
2) Adjust the horizontal frequency slug (B1) until a single vertical or diagonal bar appears in the picture.
3) Turn the hold control to maximum counter-clockwise. The picture will normally fall out of horizontal sync. If it does not, momentarily interrupt the signal by switching to another channel and back again.
4) Adjust the horizontal lock-in trimmer (B2) until 3 to 4 bars are present just before pull in, as the hold control is turned clockwise.
5) Repeat the check of horizontal oscillator.

COMPLETE HORIZONTAL OSCILLATOR ALIGNMENT

If proper horizontal oscillator pull in range can not be obtained by the slight retouch alignment, the horizontal oscillator will require alignment using an oscilloscope as follows:
a) Turn the horizontal lock slug (B3) fully out (counter-clockwise).
b) Turn the horizontal lock in trimmer (B2) and horizontal drive trimmer (B4) 1/2 turn counter-clockwise from tight.
c) Turn the contrast control to approximately its normal position, and turn the hold control to fully counter-clockwise.
d) Adjust B1 until the picture falls into synchronization. If sync cannot be obtained, turn B2 1/4 turn clockwise and repeat this step.
e) Connect the low capacity probe of an oscilloscope between terminal "C" of L17 and chassis.
f) Adjust B3 until the broad and sharp peaks of the waveform on the scope are of equal height as shown in figure 8. If necessary turn the hold control to keep the picture in sync while adjusting B3.
g) Remove the oscilloscope and turn the horizontal hold control to fully clockwise. Adjust B1 until the entire picture appears to move slowly across the face of the tube. The horizontal blanking signal should appear as a single vertical or diagonal bar.
h) Turn the hold control to fully counter clockwise, the picture will normally fall out of sync. If it does not, momentarily interrupt the signal by switching to another channel and back again.
i) Carefully adjust B2 until 3 or 4 diagonal bars are present just before the picture pulls into sync as the hold control is rotated clockwise.
j) Adjust the horizontal drive trimmer (B4) clockwise from fully out for the best compromise between horizontal linearity and line focus. (the trimmer screw will fall out if the screw is turned too far counter-clockwise).
k) Adjust the horizontal linearity slug (B5) until the picture is symmetrical from left to right. It may be necessary to adjust B4 and B5 alternately for best results.
l) Adjust the width slug (B6) until the picture just fills the mask horizontally.
m) Turn the horizontal hold control to maximum counter-clockwise and adjust B1 until the blanking bar appears in the picture as a single vertical or diagonal bar.
n) Turn the horizontal hold control to synchronize the picture and perform the check of horizontal oscillator.

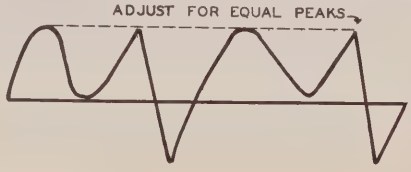


FIG. 8

TV PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF	6AU6	6AU6	7BK	
V4	2nd Video IF	6AU6	6AU6	7BK	
V5	3rd Video IF	6AU6	6AU6	7BK	
V6	Video DET. -AGC	6AL5	6AL5	6BT	
V7	Video Amp.	6AU6	6AU6	7BK	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Det.	6AL5	6AL5	6BT	
V10	AF Amp. -Sync. Clipper	6SN7GT	6SN7GT	8BD	
V11	Audio Output	6AS5	6AS5	7CV	
V12	Sync. Amp. -Sync. Sep.	12AU7	12AU7	9A	
V13	Vert. Osc. -Vert. Amp.	12AU7	12AU7	9A	
V14	Hor. AFC-Hor. Osc.	6SN7GT	6SN7GT	8BD	
V15	Hor. Output	6BG6G	6BG6G	5BT	
V16	Damper	6W4GT	6W4GT	4CG	
V17	HV Rectifier	1X2	1X2	7CB	
V18	LV Rectifier	5U4G	5U4G	5T	
V19A	Picture Tube	12LP4A	12LP4A	12D	Used in chassis 20Z1
B	Picture Tube	12LP4	12LP4	12D	Used in chassis 20Y1
C	Picture Tube	10BP4	10BP4	12D	Used in chassis 20X1

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	80	450	67C15-10	AFH1684J			TVL-310	▲ Filter
B	40	450						■ Filter
C	20	450						▲ Filter
C2A	20	450	67C15-11	AFH4J12F20A			TVL-309	▲ Decoupling
B	60	250						■ Decoupling
C	100	25						▲ Vert. Output Cath. Bypass
C3A	40	250	67C15-52	AFH844F			TVL-205	■ Decoupling
B	40	250						▲ Decoupling
C4	4	50	67A4-4	PRS150/4			TVA-13	Stabilizing Cap.
C5	5		98A45-22	SI5DNPO	D2-4.7	NPOK-5		Fixed Trimmer *
C6	.5-3		98A45-87		829-3			Variable Trimmer
C7	.5-3		98A45-23		829-3			Variable Trimmer
C8	1000		98A45-24	GP1000M	D6-102	GP2L-001		RF Filament Bypass
C9	120		98A45-25	GP120K	D6-121	GP2K-120		RF Decoupling
C10	100		98A45-26	GP100K	D6-101	GP1K-100		RF Coupling
C11	.5-3		98A45-23		829-3			Variable Trimmer
C12	20		98A45-27	SI20KNPO	D2-20	NPOK-20		Osc. Grid Cap.
C13	10		98A45-79	SI10DN750	DN-10	N750K-10		Fixed Trimmer
C14	.5-3		98A45-23		829-3			Variable Trimmer
C15	1000		98A45-24	GP1000M	D6-102	GP2L-001	29C4	Mixer Filament Bypass
C16	10		98A45-64	CN10DNPO	D2-10	NPOK-10		Fixed Trimmer
C17	120	300	98A45-78	GP120K	D6-121	GP2K-120		IF Coupling
C18	1000		98A45-24	GP1000M	D6-102	GP2L-001		RF Bypass *
C19	5000		65A10-1	BPD-5	D6-502	811-005	29C1	Filament Bypass
C20	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C21	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	1st V. IF Decoupling
C22	1000		65B6-41	GP1000M	D6-102	GP2L-001	29C4	AGC Filter
C23	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	2nd V. IF Decoupling
C24	.25	200	64B5-28	P488-25			TC-2	AGC Filter
C25	5000		64B5-12	BPD-5	D6-502	811-005	29C1	3rd V. IF Cathode Bypass
C26	5000		65A10-1	BPD-5	D6-502	811-005	29C1	RF Bypass
C27	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	3rd V. IF Filament Bypass
C28	5		65B6-61	GP5K	D2-4.7	NPOK-5	MS-55	AGC Diode Filter
C29	5		65B6-61	GP5K	D2-4.7	NPOK-5	MS-55	V. Diode Filter
C30	5000		65A10-1	BPD-5	D6-502	811-005	29C1	RF Bypass *
C31	.1	200	64B5-30	P288-1			TM-1	Video Coupling †
C32	.01	600	64B5-10	P688-01	D6-103	821-01	TM-11	RF Bypass ‡
C33	.1	400	64B5-20	P488-1			TM-1	Video Coupling
C34	.05	400	64B5-22	P488-05			TM-15	Pic. Tube Grid Bypass
C35	2		65B6-58	SI2DNPO	D2-2.2			S. IF Coupling
C36	75		98A47-1	CN75JN150		N150L-75		Fixed Trimmer
C37	120		65B6-66	GP120K	D6-121	GP2K-120	1FM-315	S. IF Coupling
C38	5000		65A10-1	BPD-5	D6-502	811-005	29C1	S. IF Decoupling
C39	180		65B6-59	SI180JN030		N030L-180		Fixed Trimmer
C40	500		65B6-6	GP500M	D6-501	GP2K-500	1FM-35	Diode Load Cap.
C41	.002	600	64B5-14	P688-002	D6-202	GP2M-002	TM-26	De-emphasis
C42	.05	400	64B5-22	P488-05			TM-15	Audio Coupling
C43	5000		64B5-12	BPD-5	D6-502	811-005	29C1	Audio Coupling
C44	.01	400	64B5-25	P488-01	D6-103	821-01	TM-11	Audio Coupling
C45	.005	600	65A10-1	P688-005	D6-502	811-005	TM-25	Output Screen Bypass
C46	250		65B6-5	GP250M	D6-251	GP2K-250	1FM-325	Sync. Coupling §
C47	.01	600	64B5-10	P688-01	D6-103	821-01	TM-11	Sync. Coupling
C48	.05	400	64B5-7	P488-05			TM-15	Sync. Coupling
C49	.01	400	65A13-3	P488-01	D6-103	821-01	TM-11	Sync. Coupling
C50	.002	600	64B5-14	P688-002	D6-202	GP2M-002	TM-22	Integrator Net.
C51	.002	600	64B5-14	P688-002	D6-202	GP2M-002	TM-22	Integrator Net.
C52	4700	300	65B21-472	1467-005	D6-472	GP2M-0047	1FM-25	Integrator Net.
C53	6000	300	65B21-602	1467-006	D6-562	GP2M-0056	1FM-26	Vert. Osc. Grid Cap. ♦
C54	.05	600	64B5-7	P688-05			TM-15	Vert. Discharge
C55	.1	400	64B5-20	P488-1			TM-1	Vert. Sweep Coupling
C56	180		65B6-59	GP180K	D6-181	GP2K-180		Hor. Sync. Coupling
C57	.002	600	65A13-4	P688-002	D6-202	GP2M-002	TM-22	Hor. Sync. Coupling
C58	.02	400	64B5-24	P488-02			TM-12	AFC Filter
C59	.2	200	64B5-29	P488-22			68P18	AFC Filter
C60	.05	400	64B5-22	P488-05			TM-15	Hor. AFC Plate Bypass
C61	180		65B6-59	GP180K	D6-181	GP2K-180		Hor. Osc. Grid Cap.
C62	.01	600	64B5-25	P688-01			TM-11	Fixed Trimmer
C63	.002	600	64B5-14	P688-002	D6-202	GP2M-002	TM-22	Hor. Discharge
C64	470	500	65B21-471	1468-0005	D6-471	GP2K-470	1FM-35	Hor. Sweep Coupling
C65	.05	600	64B5-7	P688-05			TM-15	Hor. Output Screen Bypass
C66	.2	200	64B5-29	P488-22			TC-2	Hor. Output Cathode Bypass
C67	.035	600	64A2-5	P688-033				Damper Filter
C68	.05	600	64B5-22	P688-05			TM-15	Damper Filter

TV PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ADMIRAL Part No.	AEROVOX Part No.	CENTRALAB Part No.	ERIE Part No.	SPRAGUE Part No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C69	.035	600	64A2-5	[illegible]				Fixed Trimmer ¶
C70	.5	200	64B6-27	P288-5			TC-5	Hor. Sweep Coupling
C71	7.5	1500	65A23-3					Hor. Feedback
C72	500	10000	65A11-2		TV2-501			HV Filter

* Not used in all models.
† Not used in early production runs.
‡ Some models use .005MFD in this application.
§ Early models use 120MMF in this application.
♦ Early models use 4700MMF in this application.
¶ Used only in chassis 20Y1 and 20Z1.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	INSTALLATION NOTES
R1A	3000Ω	½	75B11-13			SBB-501-S	Contrast control-front
B	350KΩ	½					Volume control and switch-rear
R1A	1350Ω	4	75B12-5				Focus control-front-Wire Wound-See Note 1 and 2
B	250KΩ	½					Volume control and switch-rear-See Note 1
R2A	100KΩ	½	75A13-11	Q11-128	M-49-S	AN-40	Brightness control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-4	Attach to R2A per instructions
R2A	100KΩ	½	75B11-10				Brightness control-front-See Note 1
B	2000Ω	½					Contrast control-rear-See Note 1
R3A	1.5 Meg.	½	75A13-8	Q11-138	M-83-S	AN-75	Vert. hold control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-4	Attach to R3A per instructions
R3A	1.5 Meg.	½	75B11-9				Vert. hold control-panel-See note 1
B	50KΩ						Horiz. hold control-rear-See note 1
R4	50KΩ	½	75A13-9	Q11-133		B-31	Horiz. hold control
R5	1350Ω	4	75A13-10		43-1500	SVS-925	Focus control-Wire Wound
R6A	3000Ω	½	75A13-7	Q11-112	M-15-S	AN-7	Vert. linearity control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R6A per instructions
R7A	2.5 Meg.	½	75A13-3	Q11-239	M-84-S	AN-83	Height control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R7A per instructions

Note 1. Used in chassis 20X1 and 20Y1 only.
Note 2. Early models use 1500Ω, 2 watt control.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R8	3900Ω	½	98A45-16	BTS-3900	Ant. Coil Shunt
R9	47KΩ 20%	½	98A45-17	BTS-47K	AGC Network
R10	10KΩ	½	98A45-18	BTS-10K	RF Plate Coil Shunt
R11	2200Ω 20%	½	98A45-19	BTS-2200	RF Decoupling
R12	4700Ω	½	98A45-20	BTS-4700	Mixer Grid
R13	220KΩ 20%	½	98A45-21	BTS-220K	Mixer Grid
R14	15KΩ 20%	½	98A45-67	BTS-15K	Mixer Plate
R15	10KΩ	½	98A45-18	BTS-10K	Osc. Grid
R16	4700Ω	½	98A45-20	BTS-4700	Osc. Plate
R17	1000Ω	½	60B8-102	BTS-1000	Decoupling
R18	100KΩ	½	60B8-104	BTS-100K	AGC Network
R19	1000Ω	½	60B8-102	BTS-1000	AGC Network
R20	10KΩ 5%	½	60B7-103	BTS-10K-5%	1st Video IF Grid
R21	82Ω	½	60B28-31		1st Video IF Cathode
R22	1000Ω	½	60B8-102	BTS-1000	1st Video IF Decoupling
R23	18KΩ	½	60B8-183		2nd Video IF Transformer Shunt
R24	82Ω	½	60B28-31		2nd Video IF Cathode
R25	1000Ω	½	60B8-102	BTS-1000	2nd Video IF Decoupling
R26	10KΩ 5%	½	60B7-103		3rd Video IF Transformer Shunt
R27	150Ω	½	60B8-151		3rd Video IF Cathode
R28	560KΩ	½	60B8-564	BTS-560K	AGC Network
R29	47KΩ	½	60B8-473	BTS-47K	AGC Rect. Diode Load
R30	4700Ω 5%	½	60B7-472	BTS-4700-5%	Video Det. Diode Load
R31	1.2 Meg.	½	60B8-125	BTS-1.2 Meg.	Video Amp. Grid-See Note 3
R32	5600Ω	1	60B14-562	BTA-5600	Video Amp. Plate
R33	10KΩ	½	60B7-103	BTS-10K	Isolation
R34	270KΩ	½	60B8-274	BTS-270K	Isolation
R35	100KΩ	½	60B8-104	BTS-100K	Voltage Divider
R36	470KΩ	½	60B8-474	BTS-470K	Voltage Divider
R37	470KΩ	½	60B8-474	BTS-470K	Picture Tube Cathode
R38	1 Meg.	½	60B8-105	BTS-1 Meg.	Sound IF Grid
R39	1000Ω	½	60B8-102	BTS-1000	Sound IF Decoupling
R40	10KΩ 5%	½	60B7-103	BTS-10K-5%	Ratio Det. Diode Load
R41	10KΩ 5%	½	60B7-103	BTS-10K-5%	Ratio Det. Diode Load
R42	390Ω	½	60B8-391		Balancing
R43	33KΩ	½	60B8-333	BTS-33K	De-emphasis
R44	4.7 Meg.	½	60B8-475	BTS-4.7 Meg.	AF Amp. Grid
R45	470KΩ	½	60B8-474	BTS-470K	AF Amp. Plate
R46	680KΩ 5%	½	60B7-684	BTS-680K-5%	Output Grid
R47	820KΩ 5%	½	60B7-824	BTS-820K-5%	Voltage Divider
R48	820Ω	2	60B20-821	BT-2-820	Filter
R49	2.2 Meg.	½	60B8-225	BTS-2.2 Meg.	Sync. Amp. Grid
R50	47KΩ	½	60B8-473	BTS-47K	Sync. Amp. Plate
R51	270KΩ	½	60B8-274	BTS-270K	Sync. Sep. Cathode
R52	270KΩ	½	60B8-274	BTS-270K	Sync. Sep. Plate
R53	15KΩ	½	60B8-153	BTS-15K	Voltage Divider
R54	1 Meg.	½	60B8-105	BTS-1 Meg.	Sync. Clipper Grid
R55	22KΩ	1	60B14-223	BTA-22K	Sync. Clipper Plate
R56	15KΩ	½	60B8-153	BTS-15K	Voltage Divider
R57	22KΩ	½	60B8-223	BTS-22K	Integrator Network
R58	8200Ω	½	60B8-822	BTS-8200	Integrator Network
R59	8200Ω	½	60B8-822	BTS-8200	Integrator Network
R60	1.2 Meg.	½	60B8-125	BTS-1.2 Meg.	Vert. Osc. Grid
R61	2.2 Meg.	½	60B8-225	BTS-2.2 Meg.	Vert. Osc. Plate-See Note 4
R62	3900Ω	½	60B8-392	BTS-3900	Vert. Peaking
R63	2.2 Meg.	½	60B8-225	BTS-2.2 Meg.	Vert. Amp. Grid
R64	470Ω	½	60B8-471	BTS-470	Vert. Amp. Cathode
R65	820KΩ	½	60B8-824	BTS-820K	Horiz. AFC Grid
R66	150KΩ	½	60B8-154	BTS-150K	Horiz. AFC Cathode
R67	220KΩ	½	60B8-224	BTS-220K	Horiz. AFC Cathode-See Note 5
R68	8200Ω	½	60B8-822	BTS-8200	Horiz. AFC Filter Network
R69	2.7 Meg.	½	60B8-275	BTS-2.7 Meg.	Voltage Divider
R70	100KΩ 5%	½	60B8-104	BTS-100K-5%	Horiz. Osc. Grid
R71	8200Ω	½	60B8-822	BTS-8200	Horiz. Osc. Transformer Shunt
R72	22KΩ	½	60B8-223	BTS-22K	Horiz. Osc. Transformer Shunt
R73	75KΩ 5%	½	60B7-753		Horiz. Osc. Plate

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL Part No.	IRC Part No.	IDENTIFICATION CODES
R74	120KΩ	½	60B8-124	BTS-120K	Horiz. AFC Filter Network
R75	68KΩ	½	60B8-683	BTS-68K	Voltage Divider
R76	120KΩ	1	60B14-124	BTA-120K	Voltage Divider
R77	1500Ω	1	60B14-152	BTA-1500	Decoupling
R78	47Ω	½	60B8-470		Parasitic Supp.
R79	470KΩ	½	60B8-474	BTS-470K	Horiz. Output Grid
R80	82Ω	2	60B20-820	BW-2-82	Horiz. Output Cathode
R81	100Ω	½	60B8-101		Parasitic Supp.
R82	8200Ω	2	60B20-822	BT-2-8200	Horiz. Output Screen
R83	3.3Ω	½	60B28-10		HV Rect. Filament-Wire Wound
R84	1 Meg.	1			HV Filter-See Note 6
R85	560KΩ	½	60B8-564	BTS-560K	Feedback
R86	150Ω	1	60B14-151	BW-1-150	Focus Coil Shunt-See Note 7 and 8
R87	750Ω	7.5	61A1-17	AB-750	Series Focus Control-Wire Wound
R88	750Ω	7.5	61A1-17	AB-750	Series Focus Control-Wire Wound-See Notes 7 and 8
R89	270KΩ	1		BTA-270K	Line Filter-See Note 9

Note 3. Not used in early production models.
Note 4. Some 20X1 chassis use 2.7 Meg. resistor in this application.
Note 5. Early production models use 150KΩ resistor in this application.
Note 6. Some models use 470KΩ resistor in this application.
Note 7. Not used in early production models.
Note 8. Used in some models use a 1500Ω focus control.
Note 9. Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ADMIRAL Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.
T1	117VAC ⑥ 1.7A	680VCT .200ADC	5VAC ⑥ 3A	6.3VAC ⑥ 8A	80B19 ①	P-8159 (18)		

① Includes rectifier socket.
(18) Add series resistor to reduce plate voltage.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA ADMIRAL Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	NOTES
T2	162Ω	920Ω	79A18-1	A-8111 ②	A-3000 ②	TBO-1 ②	Vert. Block Osc. Trans.
T3A	465Ω	11Ω	79C28-1 ③	A-8128	HVO-3	TFB-2	Hor. Output Trans.
	Tap ⑤ 160Ω	Tap ⑤ .3Ω					
		SEC. 2 0Ω					
B	465Ω	11Ω	79C23-3 ④ ⑮	A-8128	HVO-3	TFB-2	Hor. Output Trans.
	Tap ⑤ 160Ω	Tap ⑤ .3Ω					
		SEC. 2 0Ω					
T4	730Ω	12Ω	79B24-1	A-8112	A-3036	TSO-5	Vert. Output Trans.
T5A-1	13Ω		94B24-2 ③	DY-1	MD-3		Hor. Deflection Coil
B-1	62Ω						Vert. Deflection Coil
T5A-2	13Ω		94B24-1 ④ ⑥				Hor. Deflection Coil
B-2	62Ω						Vert. Deflection Coil
T5A-3	14Ω		94B2-1 ④ ⑥				Hor. Deflection Coil
B-3	68Ω						Vert. Deflection Coil
T5A-4	14Ω		94B2-2 ④ ⑥				Hor. Deflection Coil
B-4	68Ω						Vert. Deflection Coil
T6A	240Ω		89B114-2 ⑦				Focus Coil
B	240Ω		89B35-2 ⑧		MF-3		Focus Coil

② Drill one new mounting hole.
③ Used in late production models.
④ Used in early production models.
⑤ Replace with part No. 79C28-1.
⑥ When ordering replacement, order part No. 94B24-2.
⑦ Used in sets with picture positioning lever.
⑧ Used in sets without picture positioning lever.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA ADMIRAL Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	INSTALLATION NOTES
T7	4KΩ	3.3Ω	275Ω	.3Ω	Part of 8P1E (15)	A-3849 ②	A-2930	RO-6 ②	② Drill one new mounting hole. (15) Used in models 32X15 and 32X16.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA ADMIRAL Part No.	JENSEN Part No.	QUAM Part No.	INSTALLATION NOTES
	FIELD RES.	V. C. IMP.		ST-102		(11) Used in models 32X26, 32X27, 32X35, 32X36
5P1A	PM	3.5Ω	78B44-3 ② (11)	MOD. P12-S	12A4A (10)	(12) Used in models 20X11, 20X12, 20X135, 20X136, 20X137, 12X11, 12X12.
B			78B50-1 ② (12)			(13) Used in models 20X121, 20X122, 20X145, 20X146, 20X147, 22X12, 24A125AN.
C			78B51-1 ② (13)			(14) Used in models 24X15, 24X15S, 24X16, 24X16S, 24X17.
D			78B52-1 ② (14)			(15) Used in models 32X15, 32X16
E	PM	3.3Ω	78C53-1 ② (15)	ST-120 MOD. P10-S	10A4A (10)	(16) Used in models 22X25, 22X26, 22X37
F			78B54-1 ② (16)			② Includes output transformer.
	CONE DIA.	V. C. DIA.				(10) Remount output transformer and filter choke
5P2A	11 1/2"	1"				
B						
C						
D						
E	9 1/2"	1"				
F						

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA ADMIRAL Part No.	STANCOR Part No.	MERIT Part No.	CHICAGO Part No.	INSTALLATION NOTES
L1	.300A	85Ω	2.5 Henry	Part of 8P1E	C-3325 ②	C-2994 ②	TR-3300 ②	② Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ADMIRAL Part No.	MEISSNER Part No.	NOTES
L2	Ant. Coil	0Ω	0Ω			Part of tuner 94C21-1
L3	RF Plate, Mixer Grid & Osc. Coils	0Ω				See miscellaneous section for individual coil part numbers. Part of tuner 94C21-1
L4	Fil. Choke	0Ω		98A45-13		
L5	Fil. Choke	0Ω		98A45-14		
L6	1st Video IF	.8Ω		98A45-77		
L7	Fil. Choke	0Ω		73A2-5		
L8	2nd Video IF	.3Ω	.3Ω	72A83-3		
L9	3rd Video IF	.3Ω	.3Ω	72A83-3		
L10	4th Video IF	.3Ω	.3Ω	72A83-3		
L11	Peaking	17Ω		73A5-6		Wound on 33KΩ resistor
L12	Peaking	17Ω		73A5-7		
L13	Peaking	7.2Ω		73A5-8		Wound on 22KΩ resistor
L14	Peaking	8.2Ω		73A5-9		Wound on 10KΩ resistor
L15	Sound IF	1Ω		72A60-1		
L16	Ratio Det. Trans.	3.6Ω	.2Ω	72B68		
L17	Horiz. Osc. Trans.	140Ω	36Ω	69B110		
L18	Horiz. Lin.	36Ω		94A3		
L19	Horiz. Size	.1Ω		94A4-1		
L20	Fil. Choke	0Ω		73A2-5		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA ADMIRAL Part No.	NOTES
M1	Bayonet	6-8	.15	Brown	82A10-8	Type #47

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL Part No.	NOTES
M2A	RF Tuner	94C21-2	
B	RF Tuner	94C21-1	
M3	Ion Trap	94B6	
M4	Fuse	84A7-1	.25A 250V
M5	Dual Trimmer	66A32-1	Horiz. Drive 40-370MMFD
M6			Horiz. Range 10-160MMFD
M7A	Antenna Assembly	A3029	Models 20X135, 20X136, 20X137
B	Antenna Assembly	A3060	Models 20X11, 20X12, 20X121, 20X122, 24X15 , 24X15S, 24X16, 24X16S, 24X17S
C	Antenna Assembly	A3072	Models 20X145, 20X146, 20X147
D	Antenna Assembly	A3029	Model 24A125AN
	INDIVIDUAL CHANNEL COILS FOR TV TUNER 94C21-2:		
	Antenna	98A62-2	Channel 2
	Antenna	98A62-3	Channel 3
	Antenna	98A62-4	Channel 4
	Antenna	98A62-5	Channel 5
	Antenna	98A62-6	Channel 6
	Antenna	98A62-7	Channel 7
	Antenna	98A62-8	Channel 8
	Antenna	98A62-9	Channel 9
	Antenna	98A62-10	Channel 10
	Antenna	98A62-11	Channel 11
	Antenna	98A62-12	Channel 12
	Antenna	98A62-13	Channel 13
	Mixer-Osc.	98A63-2	Channel 2
	Mixer-Osc.	98A63-3	Channel 3
	Mixer-Osc.	98A63-4	Channel 4
	Mixer-Osc.	98A63-5	Channel 5
	Mixer-Osc.	98A63-6	Channel 6
	Mixer-Osc.	98A63-7	Channel 7
	Mixer-Osc.	98A63-8	Channel 8
	Mixer-Osc.	98A63-9	Channel 9
	Mixer-Osc.	98A63-10	Channel 10
	Mixer-Osc.	98A63-11	Channel 11
	Mixer-Osc.	98A63-12	Channel 12
	Mixer-Osc.	98A63-13	Channel 13
	INDIVIDUAL CHANNELS COILS FOR TV TUNER 94C21-1:		
	Antenna	98A58-2	Channel 2
	Antenna	98A58-3	Channel 3
	Antenna	98A58-4	Channel 4
	Antenna	98A58-5	Channel 5
	Antenna	98A58-6	Channel 6
	Antenna	98A58-7	Channel 7
	Antenna	98A58-8	Channel 8
	Antenna	98A58-9	Channel 9
	Antenna	98A58-10	Channel 10
	Antenna	98A58-11	Channel 11
	Antenna	98A58-12	Channel 12
	Antenna	98A58-13	Channel 13
	Mixer-Osc.	98A59-2	Channel 2
	Mixer-Osc.	98A59-3	Channel 3
	Mixer-Osc.	98A59-4	Channel 4
	Mixer-Osc.	98A59-5	Channel 5
	Mixer-Osc.	98A59-6	Channel 6
	Mixer-Osc.	98A59-7	Channel 7
	Mixer-Osc.	98A59-8	Channel 8
	Mixer-Osc.	98A59-9	Channel 9
	Mixer-Osc.	98A59-10	Channel 10
	Mixer-Osc.	98A59-11	Channel 11
	Mixer-Osc.	98A59-12	Channel 12
	Mixer-Osc.	98A59-13	Channel 13
	Knob	33C28-29	Ebony Channel Selector
	Knob	33C28-19	Maroon Channel Selector
	Knob	33C28-38	Mahogany Channel Selector
	Knob	33C28-17	Gold Channel Selector
	Knob	33C28-20	Maroon Horiz. Hold, Contrast, Volume
	Knob	33C28-41	Mahogany Horiz. Hold, Contrast, Volume
	Knob	33C28-18	Gold Horiz. Hold, Contrast, Volume
	Knob	33C28-35	Brass Fine Tuning
	Knob	33C28-21	Maroon Fine Tuning
	Knob	33C28-36	Brass Vert. Hold, Brightness, Focus
	Knob	33C28-22	Maroon Vert. Hold, Brightness, Focus

RADIO **PARTS LIST AND DESCRIPTIONS** (CH. 5B2)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ADMIRAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V20	Converter	12AT7	12AT7	9A	Used in radio chassis 5B2
V21	IF Amp.	6BA6	6BA6	7BK	Used in radio chassis 5B2
V22	2nd FM IF Amp. - DET.	6BA6	6BA6	7BK	Used in radio chassis 5B2
V23	Ratio Det.	6AL5	6AL5	6BT	Used in radio chassis 5B2
V24	AF Amp.	6AU6	6AU6	7BK	Used in radio chassis 5B2
V25	Power Output	6V6GT	6V6GT	7AC	Used in power chassis 2PA1
V26	Rectifier	5Y3GT	5Y3GT	5T	Used in power chassis 2PA1

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C73A	40	350	67C7-16	AF888H8A			TVL-311	▲ Filter
B	40	350						■ Filter
C	40	350						▲ Filter
D	40	25						Output Cathode Bypass
C74	4	150	67A4-2	PRS150/4			UT-41	Stabilizing Cap.
C75	5	300	65B6-61	1468-000005	D2-4.7	NPOK-5	MS-55	Ant. Coupling
C76	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	RF Coupling
C77	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Conv. Cathode Bypass
C78	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Conv. Filament Bypass
C79	.68		65A16-1					Osc. Coupling
C80	40		65B6-67	SI40KN750	DN-39	N750L-40	1FM-44	Osc. Grid Cap.
C81	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	Osc. Plate Bypass
C82	40	300	65B1-65	1469-00004	D2-39	NPOL-40	MS-44	Fixed Trimmer
C83	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Decoupling
C84	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Decoupling
C85	10000		65A10-3	BPD-10	D6-103	821-01	36C1	AVC Filter
C86	10000		65A10-3	BPD-10	D6-103	821-01	36C1	1st IF Screen Bypass
C87A	4000		65A17-1	BPD-5	D6-472	811-005	36C2	1st IF Filament Bypass
B	4000			BPD-5	D6-472	811-005		1st IF Filament Bypass
C88	10000		65A10-3	BPD-10	D6-103	821-01	36C1	RF Bypass
C89	250		65B6-5	GP250M	D6-251	GP2K-250	1FM-325	Diode RF Filter
C90	10000		65A10-3	BPD-10	D6-103	821-01	36C1	2nd IF Screen Bypass
C91	10000		65A10-3	BPD-10	D6-103	821-01	36C1	2nd IF Plate Decoupling
C92A	100		67A7-1	GP100M	D6-101	GP1K-100	1FM-31	Diode Load Cap. *
B	100		67A7-1	GP100M	D6-101	GP1K-100	1FM-31	Diode Load Cap. *
C93	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	De-emphasis
C94	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Audio Coupling
C95	100		65B6-68	GP100K	D6-101	GP1K-100	1FM-31	Tone Compensation
C96	1000		65B6-41	GP1000M	D6-102	GP2L-001	1FM-21	Tone Compensation
C97	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Audio Coupling
C98	.1	400	64B1-20	P488-1			TM-1	AF Amp. Screen Bypass
C79	5000		65A10-1	BPD-5	D6-502	811-005	29C1	Tone Compensation
C100	.1	400	64B1-20	P488-1			TM-1	RF Bypass
C101	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Ratio Det. Fil. Bypass
C102	10000		65A10-3	BPD-10	D6-103	821-01	36C1	Audio Coupling
C103	.005	600	64B1-12	P688-005	D6-502	811-005	TM-25	Output Plate Bypass

* When either items C92A or C92B are replaced, replace both with capacitors of equal value.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: ADMIRAL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R90A	2 Meg.	½	75B11-12			SBB-531-S	Tone control-front
B	2 Meg.	½					Volume control and switch-rear

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: ADMIRAL PART No.	IRC PART No.	IDENTIFICATION CODES
R91	1.5 Meg.	½	60B8-155	BTS-1.5 Meg.	Conv. Grid
R92	240Ω	½	60B7-241		Conv. Cathode
R93	22KΩ	½	60B8-223	BTS-22K	Osc. Grid
R94	470Ω	½	60B8-471	BTS-470	Osc. Plate
R95	470Ω	½	60B8-471	BTS-470	Conv. Plate Decoupling
R96	6200Ω	½	60B7-622		1st IF Screen
R97	27Ω	½	60B8-270	BW-½-27	Decoupling-See Note 10
R98	1 Meg.	½	60B8-105	BTS-1 Meg.	AVC Network
R99	470KΩ	½	60B8-474	BTS-470K	2nd FM IF Grid
R100	10KΩ	½	60B8-103	BTS-10K	2nd FM IF Screen
R101	1000Ω	½	60B8-102	BTS-1000	2nd FM IF Plate Decoupling
R102	7500Ω	5	61A1-18	AB-7500	Bleeder-Wire Wound-See Note 11
R103	27Ω	½	60B8-270	BW-½-27	Decoupling-See Note 12
R104	47KΩ	½	60B8-473	BTS-47K	Diode Filter
R105	390Ω	½	60B8-391		Balancing
R106	27KΩ	½	60B8-273	BW-½-27K	De-emphasis
R107	15KΩ	½	60B8-153	BTS-15K	Ratio Det. Diode Load
R108	15KΩ	½	60B8-153	BTS-15K	Ratio Det. Diode Load
R109	100KΩ	½	60B8-104	BTS-100K	Tone Compensation
R110	10 Meg.	½	60B8-106	BTS-10 Meg.	AF Amp. Grid
R111	560KΩ	½	60B8-564	BTS-560K	AF Amp. Screen
R112	27Ω	½	60B8-270	BW-½-27	Isolation-See Note 10
R113	270KΩ	½	60B8-274	BTS-270K	AF Amp. Plate
R114	470KΩ	½	60B8-474	BTS-470K	Output Grid
R115	200Ω	1	60B13-201		Output Cathode
R116A	2250Ω	5	61A5-6	AB-2250	Filter-Wire Wound
B	2000Ω	5		AB-2000	Filter-Wire Wound

Note 10. Some models use 22Ω resistor in this application.
Note 11. Some models use two resistors in parallel to obtain required resistance and wattage.
Note 12. Not used in all models.

RADIO **PARTS LIST (Continued)** (CH. 5B2)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T8	117VAC @ .65A	580VCT .098ADC	5VAC @ 2A	6.3VAC @ 2.4A	80B23-1	P-6312 (17)	P-2952 (17) (18)	PH-120

(17) Drill new mounting holes.
(18) Add series resistor to reduce plate voltage.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T9	3.5KΩ	3.5Ω	260Ω	.3Ω	72B31-2	A-3877	A-3018 ②	RO-8	② Drill one new mounting hole.
T10	5.5KΩ	3.5Ω	415Ω	.3Ω	72B31-3	A-3825	A-3019 ②	RO-9	

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ↶	ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L21	.200A	93Ω	3.1 Henry	74B18-2	C-2325 ②	C-3196	TR-4200 ②	② Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	ADMIRAL PART No.	MEISSNER PART No.	
L22	Loop Ant.	1.3Ω		69C116-1		Includes trimmer M14
L23	FM Built-In Antenna	0Ω		AB195		
L24	FM Ant.	0Ω		69A85		
L25	FM Osc.	0Ω		69A87		
L26	AM Osc.	7Ω		69A86-1		Taps at 1Ω and 1.8Ω
L27	FM Peaking	17Ω		73A5-11		Wound on 820Ω resistor
L28	1st FM IF	.1Ω	.5Ω	72B98		
L29	1st AM IF	3.1Ω	6Ω	72B97	16-6678	
L30	2nd FM IF	3Ω	.1Ω	72B76		
L31	2nd AM IF	6.5Ω	6.5Ω	72B94	16-6678	
L32	Ratio Det. Trans.	2.3Ω	.1Ω	72B39		
L33	Fil. Choke	0Ω	0Ω	69A102		

PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA				REMARKS
	ADMIRAL PART No.	ASTATIC PART No.		SHURE PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE
M8	409A13-1	AC-AG-J	C-AG	P73-A	A65MG

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					ADMIRAL PART No.		
M9	Bayonet	6-8	.150	Blue	81A1-8		Type #47
M10	Bayonet	6-8	.150	Blue	81A1-8		Type #47
M11	Bayonet	6-8	.150	Blue	81A1-8		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M12	Switch	76B22	Function Selector (AM-FM-Phono)
M13	Switch	76A23	Phono Motor
M14	Trimmer	Part of 69C116-1	Loop Antenna (2-20MMF)
M15	Trimmer	66A28-1	FM Oscillator (2.5-6MMF) Ceramic
M16	Tuning Gang	68B24	4 Section
	Dial Scale	22B22-1	
	Dial Pointer	25A37	Metal

RADIO **PARTS LIST AND DESCRIPTIONS** (CH.4L1, 4S1.)

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		ADMIRAL PART No.	STANDARD REPLACEMENT		
V27	Converter	6BE6	6BE6	7CH	Used in radio chassis 4S1 and 4L1
V28	IF Amp.	6BA6	6BA6	7BK	Used in radio chassis 4S1 and 4L1
V29	DET.-AVC-AF	6AV6	6AV6	7BT	Used in radio chassis 4S1 and 4L1
V30	Power Output	6AQ5	6AQ5	7BZ	Used in radio chassis 4S1 and 4L1
V31	Rectifier	5Y3GT	5Y3GT	5T	Used in power chassis 1PA1 and 1PA2

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	
C104A	30	350	67C6-22	AF66J			TVL-206	▪ Filter
B	30	350						▲ Filter
C105	50	25	67A4-7	PRS25/50			TVA-7	Output Cathode Bypass
C106	5	300	65B1-62	1468-000005	D2-4.7	NPOK-5	MS-55	Ant. Coupling
C107	50		65B6-4	GP50M	D6-500	GPIK-50	1FM-45	Osc. Grid Cap.
C108	5000		65A10-1	BPD-5	D6-502	811-005	29C1	Osc. Anode Bypass
C109	.1	200	64B5-30	P288-1			TM-1	AVC Filter
C110	5000		65A10-1	BPD-5	D6-502	811-005	29C1	IF Screen Bypass
C111A	100		*	GP100M	D6-101	GPIK-100	1FM-31	Diode RF Filter
B	100			GP100M	D6-101	GPIK-100	1FM-31	Diode RF Filter

RADIO **PARTS LIST (Continued)** (CH. 4LI, 4SI.)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C112	250		65B6-5	GP250M	D6-251	GP2K-250	1FM-325	Tone Compensation
C113	.01	400	64B5-25	P488-01	D6-103	821-01	TM-11	Tone Compensation
C114	.002	600	64B5-9	P688-002	D6-202	GP2M-002	TM-22	Tone Compensation
C115	.01	400	64B5-25	P488-01	D6-103	821-01	TM-11	Audio Coupling
C116	.1	400	64B5-20	P488-1			TM-1	AF Amp. Plate Decoupling
C117	.01	400	64B5-25	P488-01	D6-103	821-01	TM-11	Audio Coupling
C118	.002	600	64B5-14	P688-002	D6-202	GP2M-002	TM-22	Output Plate Bypass
C119	.1	400	64B5-20	P488-1			TM-1	RF Bypass

* Items C111A, C111B and R123 are combined into one unit obtainable under MFGR'S Part No. 63A3-1.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R117A	2 Meg.	$\frac{1}{2}$	75B11-11	B11-139 *		SBB-530-S	Tone control-front
B	1 Meg.	$\frac{1}{2}$		B19-137X *			Volume control-rear-tapped at 500KΩ
C	Shaft End Switch			E-202 *			Attach per instructions in "Concentrikit"
D				76-1 *			Attach per instructions in "Concentrikit"

* Additional parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ADMIRAL PART No.	IRC PART No.	IDENTIFICATION CODES
R118	22KΩ	$\frac{1}{2}$	60B8-223	BTS-22K	Osc. Grid
R119	27KΩ	1	60B14-273	BTA-27K	Osc. Anode
R120	150Ω	$\frac{1}{2}$	60B8-151	BW-$\frac{1}{2}$-150	IF Cathode
R121	27KΩ	1	60B14-273	BTA-27K	IF Screen
R122	1 Meg.	$\frac{1}{2}$	60B8-105	BTS-1 Meg.	AVC Network
R123	47KΩ	$\frac{1}{2}$	60B8-473	BTS-47K	Diode Filter
R124	27KΩ	$\frac{1}{2}$	60B8-273	BTS-27K	Tone Compensation
R125	4.7 Meg.	$\frac{1}{2}$	60B8-475	BTS-4.7 Meg.	AF Amp. Grid
R126	470KΩ	$\frac{1}{2}$	60B8-474	BTS-470K	AF Amp. Plate
R127	47KΩ	$\frac{1}{2}$	60B8-473	BTS-47K	AF Amp. Plate Decoupling
R128	470KΩ	$\frac{1}{2}$	60B8-474	BTS-470K	Output Grid
R129	270Ω	2	60B20-271	BW-2-270	Output Cathode
R130	620Ω	5	61A3-12		Filter-Wire Wound-See Note 13
R131A	620Ω	5	61A5-5		Filter-Wire Wound-See Note 14
B	260Ω	5			Surge Limiter-Wire Wound-See Note 14

Note 13. Used in power supply chassis 2PA1 only.
Note 14. Used in power supply chassis 1PA2 only.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T11	117VAC @ .50A	480VCT .065ADC	5VAC @ 2A	6.3VAC @ 1.5A	80B1	P-6120 (17)	P-2952 (17)	PH-70 (17)

(17) Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA ADMIRAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T12	4.3KΩ	3.5Ω	320Ω	.5Ω	79A22	A-3849 ②	A-3019 ②	RO-8	② Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ADMIRAL PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L34	Loop Ant.	1.5Ω		69C100-1		Includes M14
L35	Osc. Coil	6Ω		69A52-1	14-1073	Tap at .8Ω
L36	1st IF	20Ω	20Ω	72B28-7	16-6678	
L37	2nd IF	21Ω	21Ω	72B28-17	16-6678	

PHONO CARTRIDGE and NEEDLE

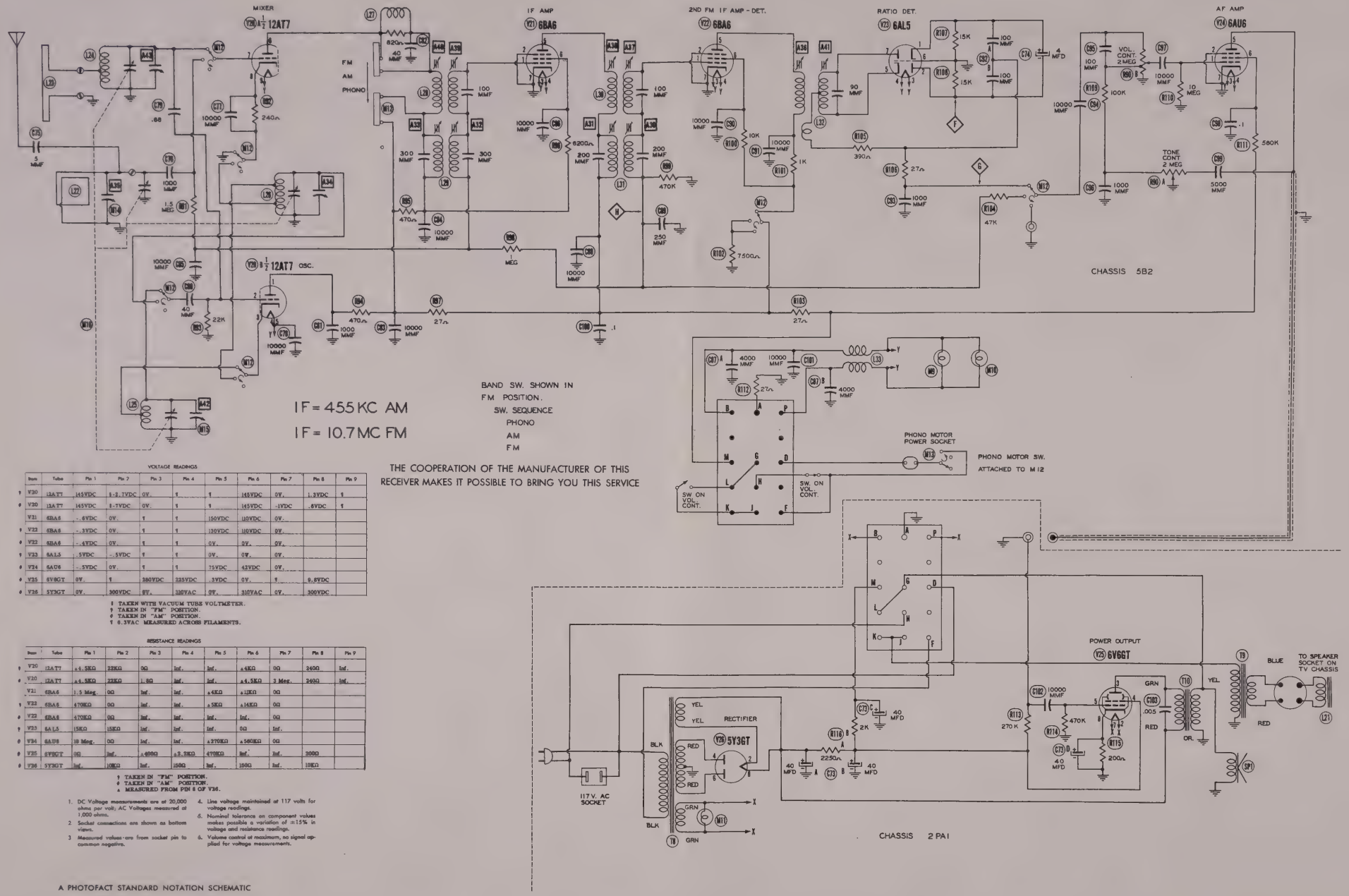
ITEM No.	REPLACEMENT DATA ADMIRAL PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	REMARKS
M17	409A13-1	AC-AG-J	C-AG	P73-A	A65MG	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA ADMIRAL PART No.		NOTES
M18	Bayonet	6-8	.150	Blue	81A1-8		Type #47
M19	Bayonet	6-8	.150	Blue	81A1-8		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M20	Switch	77A31	Function Selector
M21	Trimmer	66B8-5	Loop Antenna
M22	Tuning Gang	68B32	(24-466MMF, 21-157MMF)
	Dial Scale	22B21	
	Dial Pointer	25A33	



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
†	V20	12AT7	145VDC	8-2.7VDC	0V.	†	†	145VDC	0V.	1.3VDC	†
◊	V20	12AT7	145VDC	8-7VDC	0V.	†	†	145VDC	-1VDC	.6VDC	†
	V21	6BA6	-.6VDC	0V.	†	†	150VDC	110VDC	0V.		
†	V22	6BA6	-.3VDC	0V.	†	†	130VDC	110VDC	0V.		
◊	V22	6BA6	-.4VDC	0V.	†	†	0V.	0V.	0V.		
†	V23	6AL5	.5VDC	-.5VDC	†	†	0V.	0V.	0V.		
◊	V24	6AU6	-.5VDC	0V.	†	†	75VDC	42VDC	0V.		
◊	V25	6V6GT	0V.	†	280VDC	325VDC	.3VDC	0V.	†	9.6VDC	
◊	V26	5Y3GT	0V.	300VDC	0V.	330VAC	0V.	310VAC	0V.	300VDC	

† TAKEN WITH VACUUM TUBE VOLTMETER.
† TAKEN IN "FM" POSITION.
◊ TAKEN IN "AM" POSITION.
† 6.3VAC MEASURED ACROSS FILAMENTS.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
†	V20	12AT7	▲4.5KΩ	22KΩ	0Ω	Inf.	Inf.	▲4KΩ	0Ω	240Ω	Inf.
◊	V20	12AT7	▲4.5KΩ	22KΩ	1.8Ω	Inf.	Inf.	▲4.5KΩ	3 Meg.	240Ω	Inf.
	V21	6BA6	1.5 Meg.	0Ω	Inf.	Inf.	▲4KΩ	▲1KΩ	0Ω		
†	V22	6BA6	470KΩ	0Ω	Inf.	Inf.	▲5KΩ	▲14KΩ	0Ω		
◊	V22	6BA6	470KΩ	0Ω	Inf.	Inf.	Inf.	Inf.	0Ω		
†	V23	6AL5	15KΩ	15KΩ	Inf.	Inf.	Inf.	0Ω	Inf.		
◊	V24	6AU6	10 Meg.	0Ω	Inf.	Inf.	▲270KΩ	▲560KΩ	0Ω		
◊	V25	6V6GT	0Ω	Inf.	▲400Ω	▲2.2KΩ	470KΩ	Inf.	Inf.	200Ω	
◊	V26	5Y3GT	Inf.	10KΩ	Inf.	150Ω	Inf.	150Ω	Inf.	10KΩ	

† TAKEN IN "FM" POSITION.
◊ TAKEN IN "AM" POSITION.
▲ MEASURED FROM PIN 8 OF V26.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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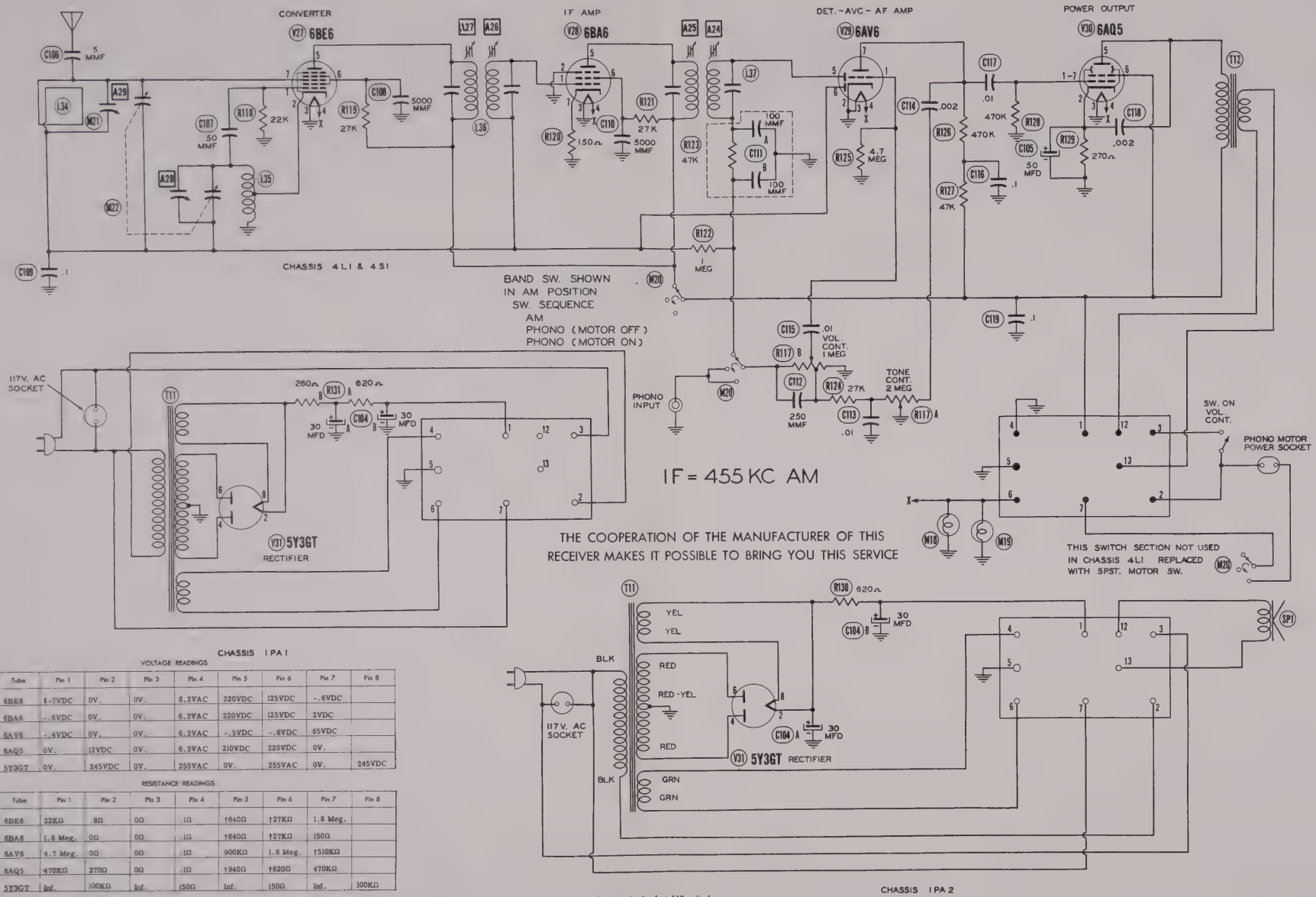
SCHEMATIC-RADIO CHASSIS 5B2



CHASSIS 1PA1

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V27	6BE6	§-.7VDC	0V.	0V.	6.3VAC	220VDC	125VDC	-.6VDC	
V28	6BA6	-.6VDC	0V.	0V.	6.3VAC	220VDC	125VDC	2VDC	
V29	6AV6	-.4VDC	0V.	0V.	6.3VAC	-.5VDC	-.6VDC	65VDC	
V30	6AQ5	0V.	12VDC	0V.	6.3VAC	210VDC	220VDC	0V.	
V31	5Y3GT	0V.	245VDC	0V.	255VAC	0V.	255VAC	0V.	245VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V27	6BE6	22KΩ	.8Ω	0Ω	.1Ω	†640Ω	†27KΩ	1.8 Meg.	
V28	6BA6	1.8 Meg.	0Ω	0Ω	.1Ω	†640Ω	†27KΩ	150Ω	
V29	6AV6	4.7 Meg.	0Ω	0Ω	.1Ω	900KΩ	1.8 Meg.	†510KΩ	
V30	6AQ5	470KΩ	270Ω	0Ω	.1Ω	†940Ω	†620Ω	470KΩ	
V31	5Y3GT	Inf.	100KΩ	Inf.	150Ω	Inf.	150Ω	Inf.	100KΩ

VOLTAGE AND RESISTANCE MEASUREMENTS TAKEN IN BROADCAST POSITION.
§ TAKEN WITH VACUUM TUBE VOLTMETER.
† MEASURED FROM PIN 2 OF V31.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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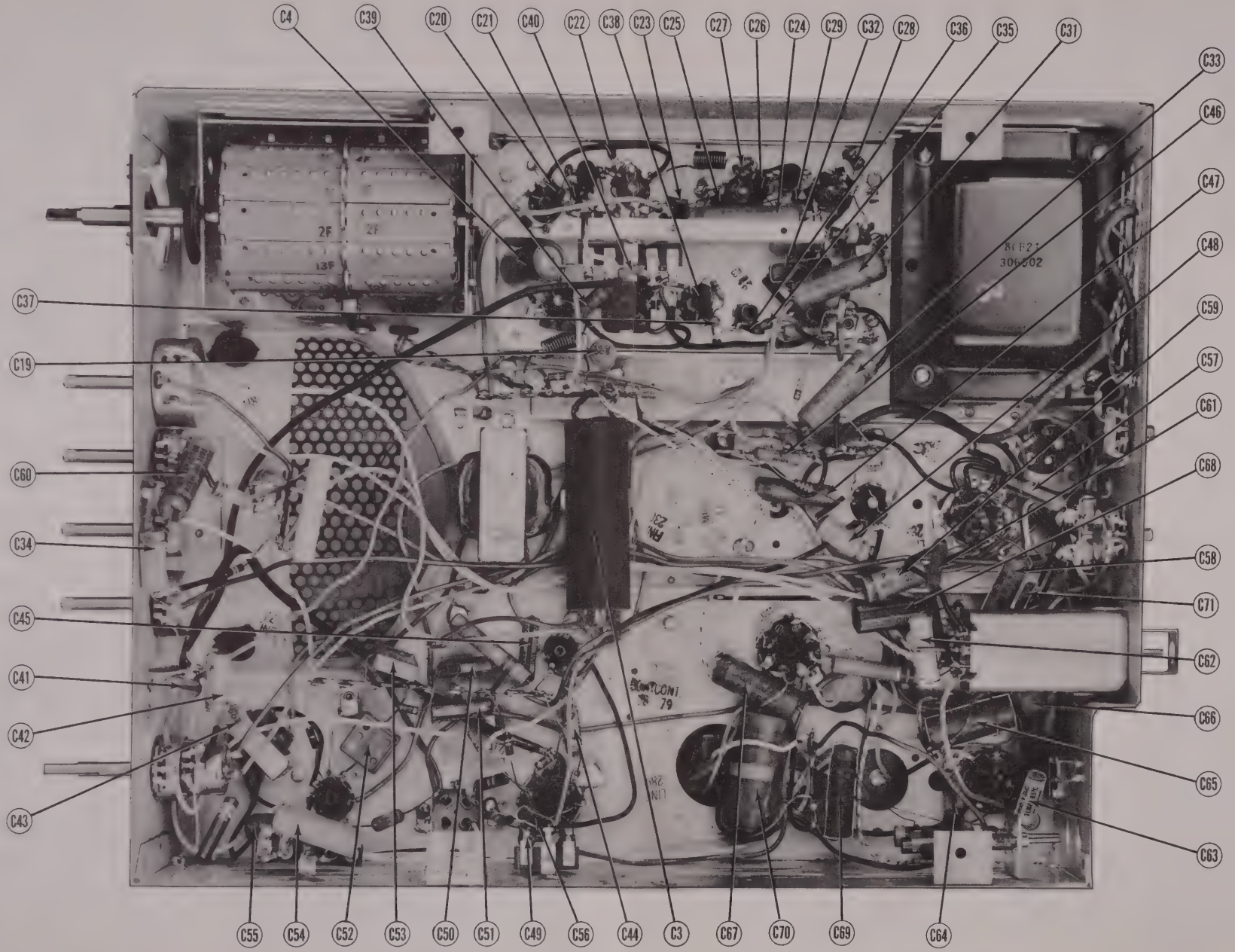
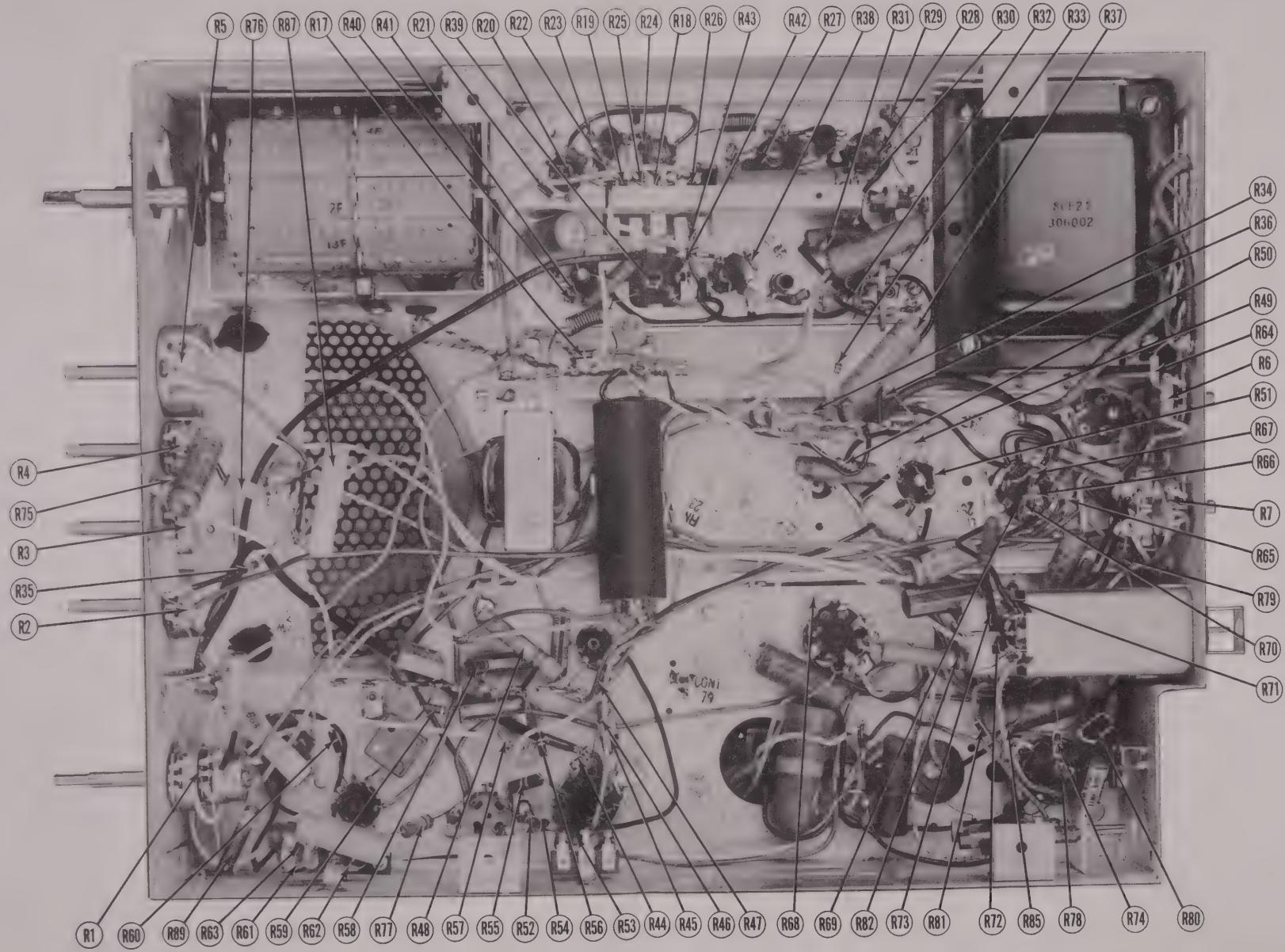
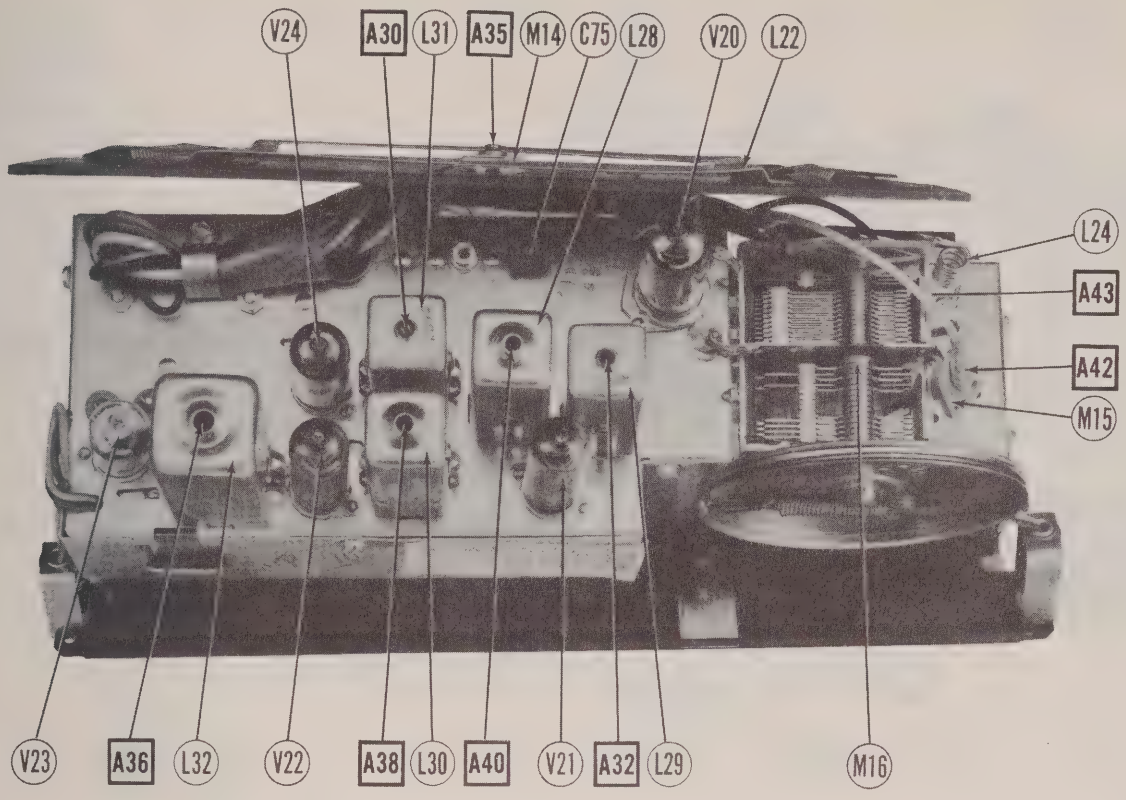
SCHEMATIC-RADIO CHASSIS 4L1, 4S1



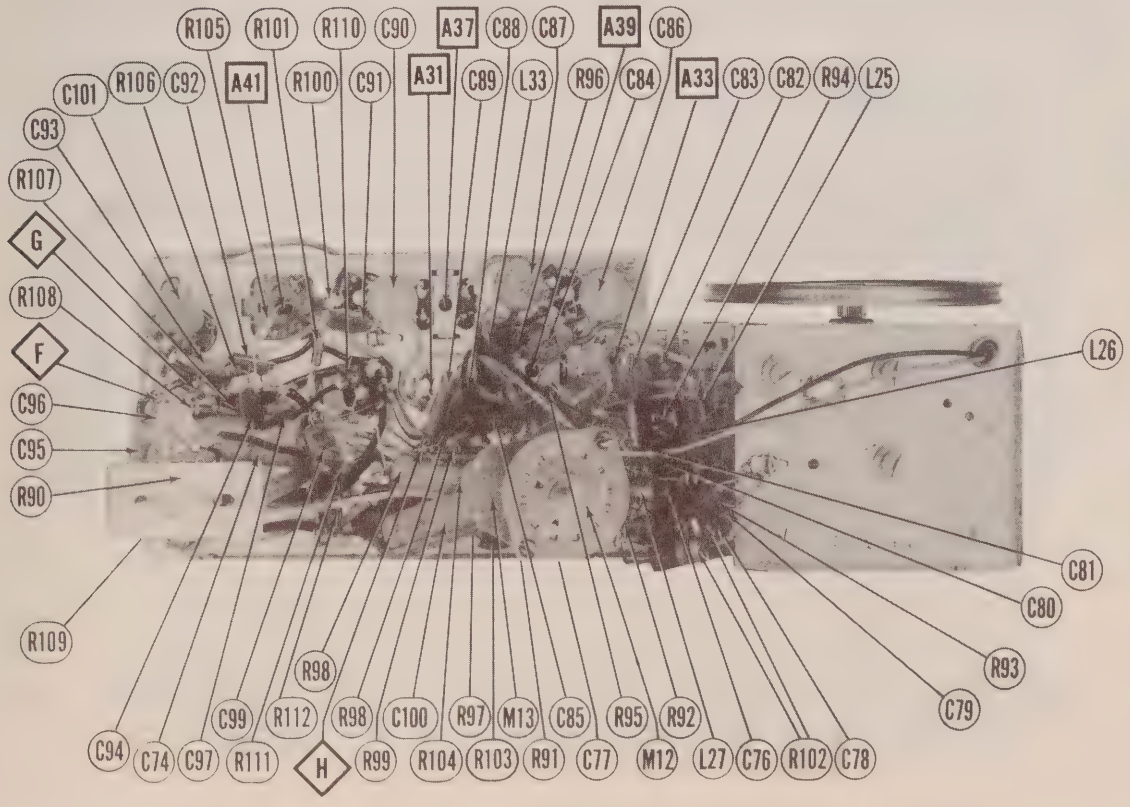
TV CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



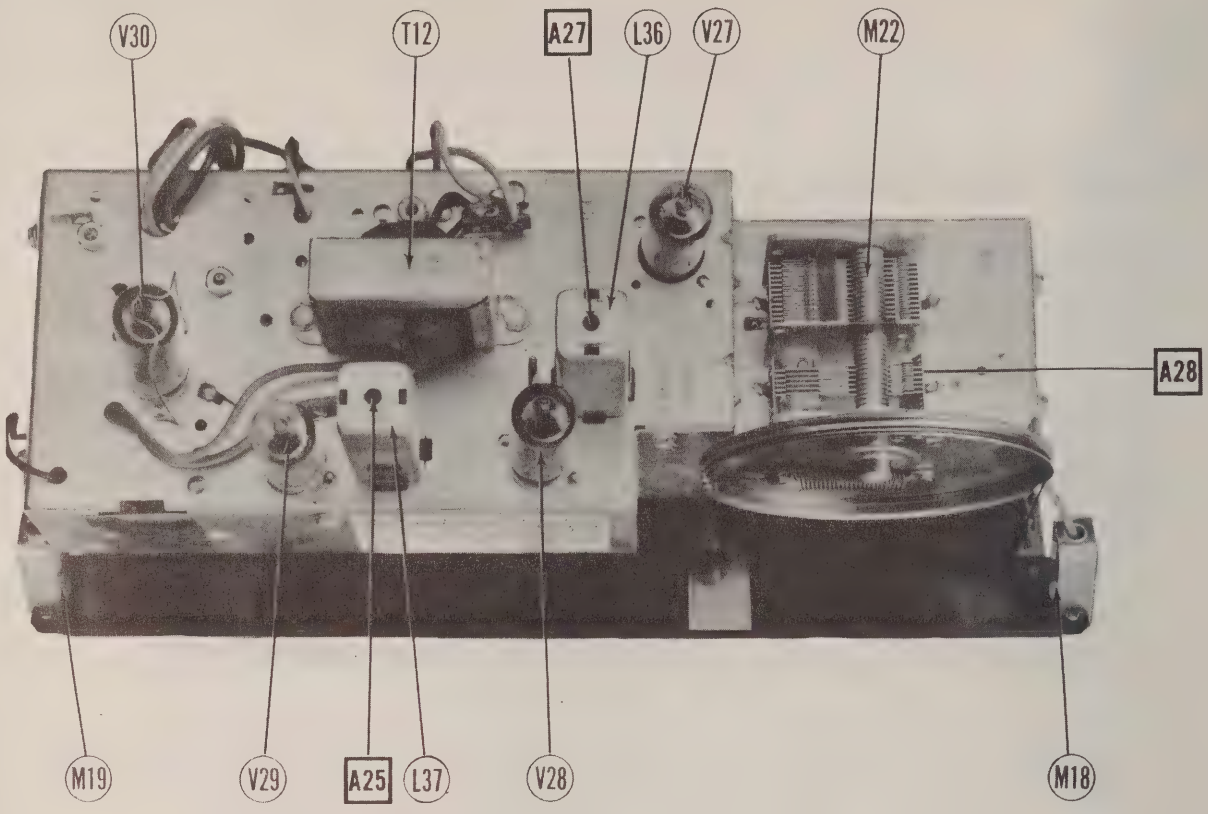
TV CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



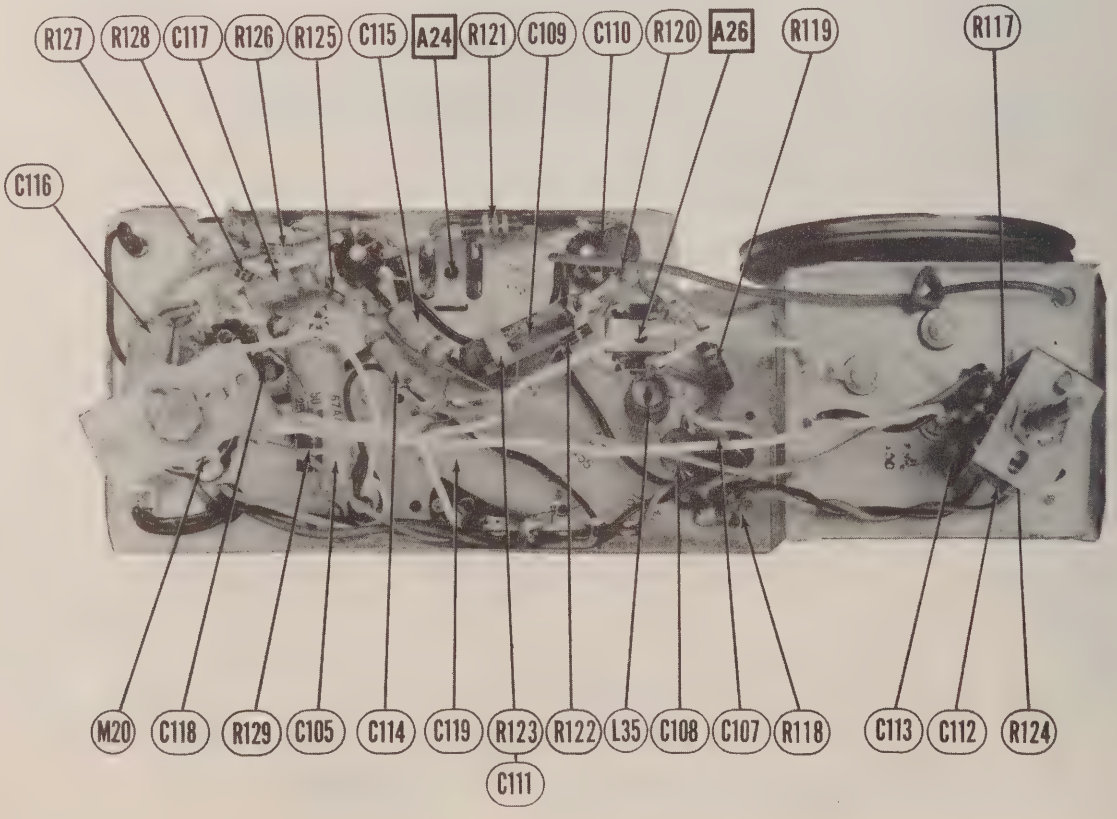
RADIO CHASSIS 5B2 - TOP VIEW



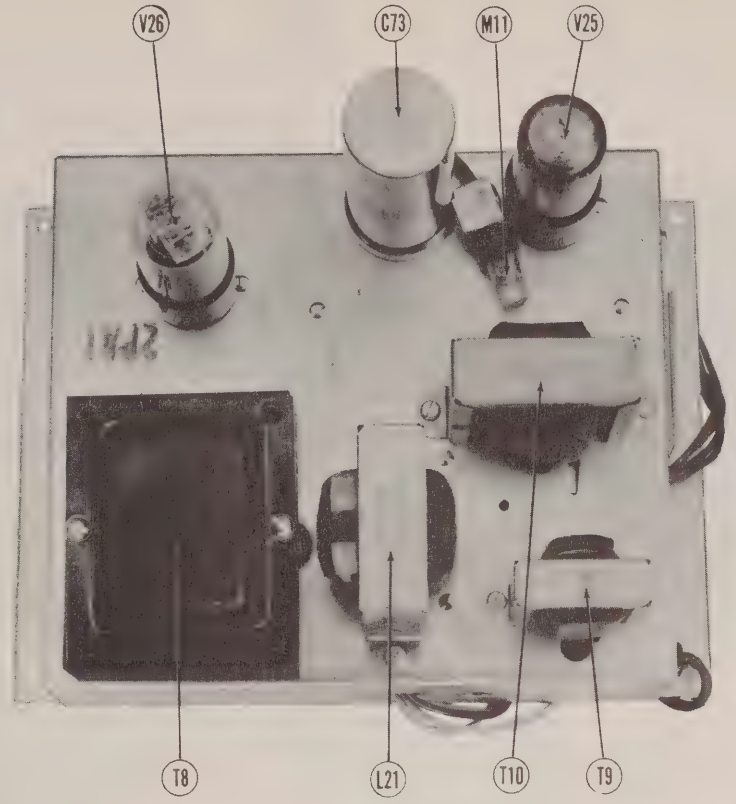
RADIO CHASSIS 5B2 - BOTTOM VIEW



RADIO CHASSIS 4SI -TOP VIEW

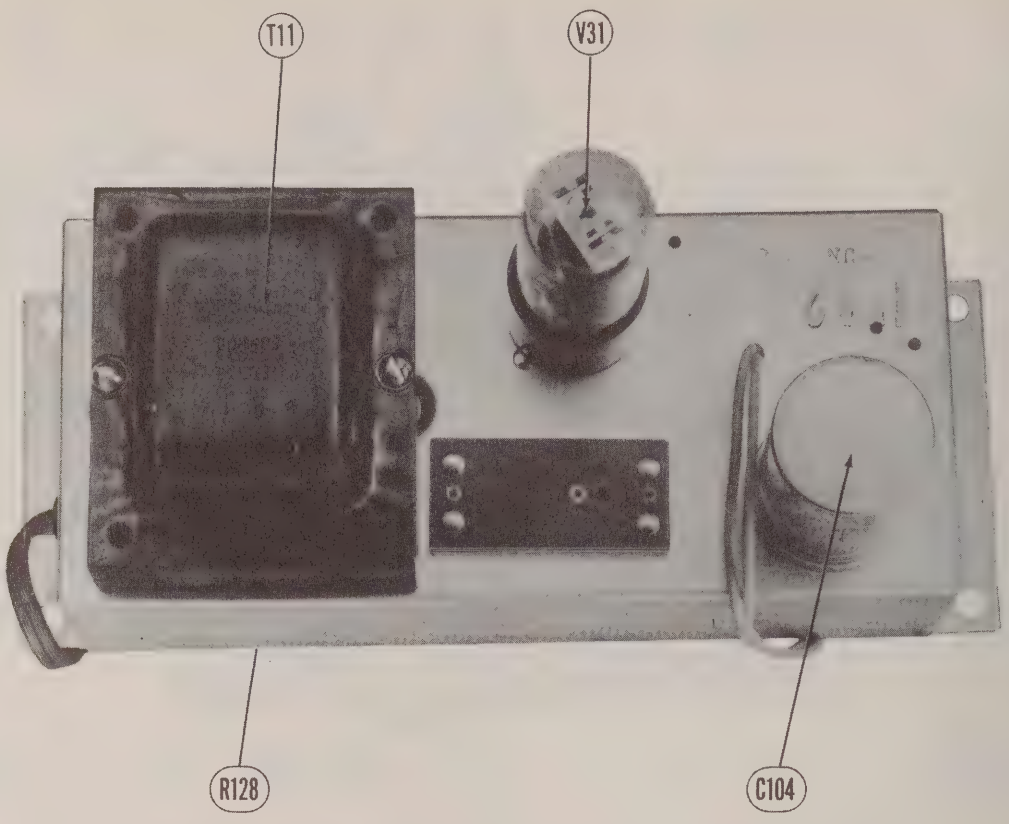


RADIO CHASSIS 4SI-BOTTOM VIEW

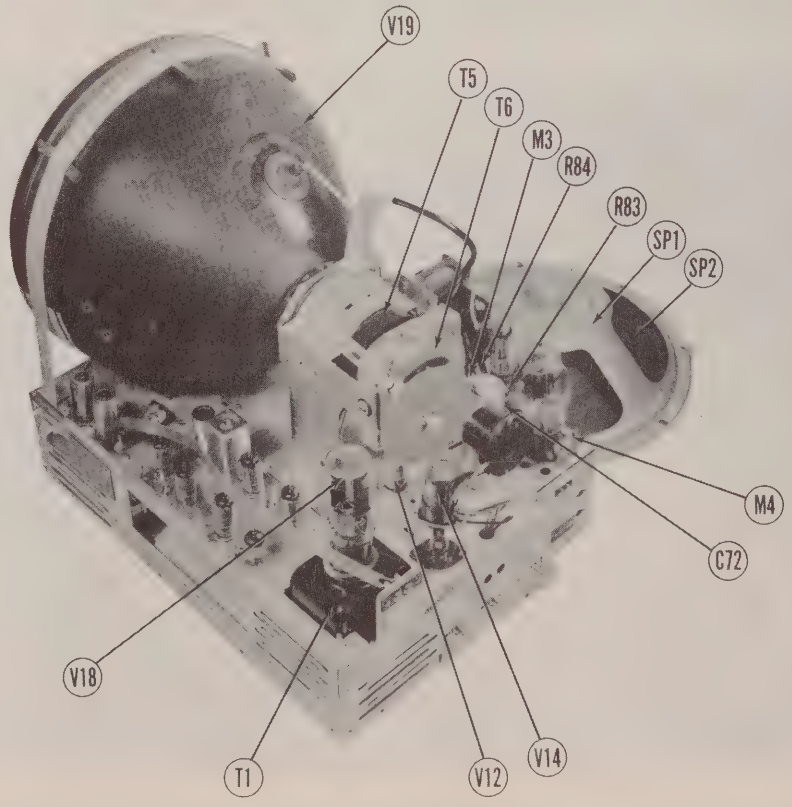


POWER SUPPLY 2PA1 -TOP VIEW

POWER SUPPLY 2PA1 -BOTTOM VIEW



POWER SUPPLY 1PA2 -TOP VIEW



TV CHASSIS TOP VIEW

DISASSEMBLY INSTRUCTIONS

TV CHASSIS

1. Remove four push-on type control knobs from front of cabinet.
2. Remove six phillips head screws holding rear cover. Remove cover,
3. Remove TV audio output and pilot light plugs from chassis.
4. Disconnect built-in antenna leads at chassis terminal.
5. Remove four 7/16" hex head bolts holding chassis at bottom. Remove chassis.

SPEAKER

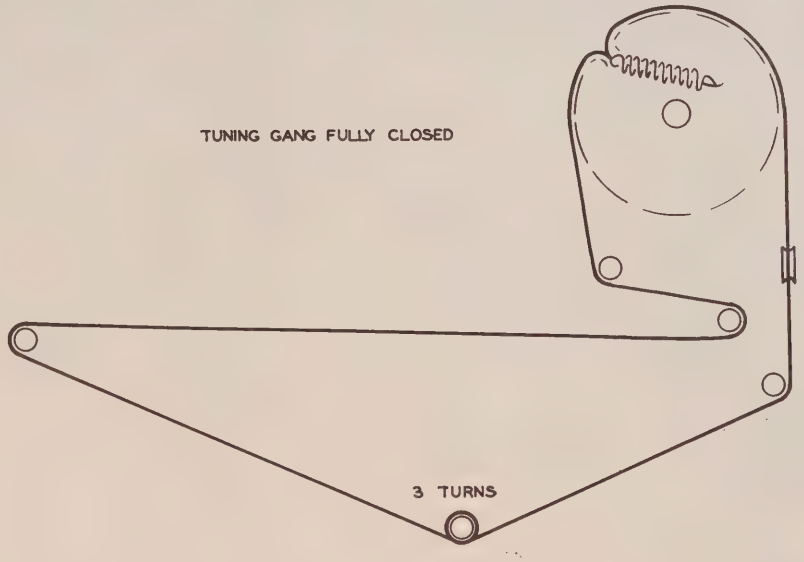
1. Remove four 11/32" hex nuts holding speaker.
2. Pull speaker out to rear of cabinet and unsolder leads.

POWER SUPPLY

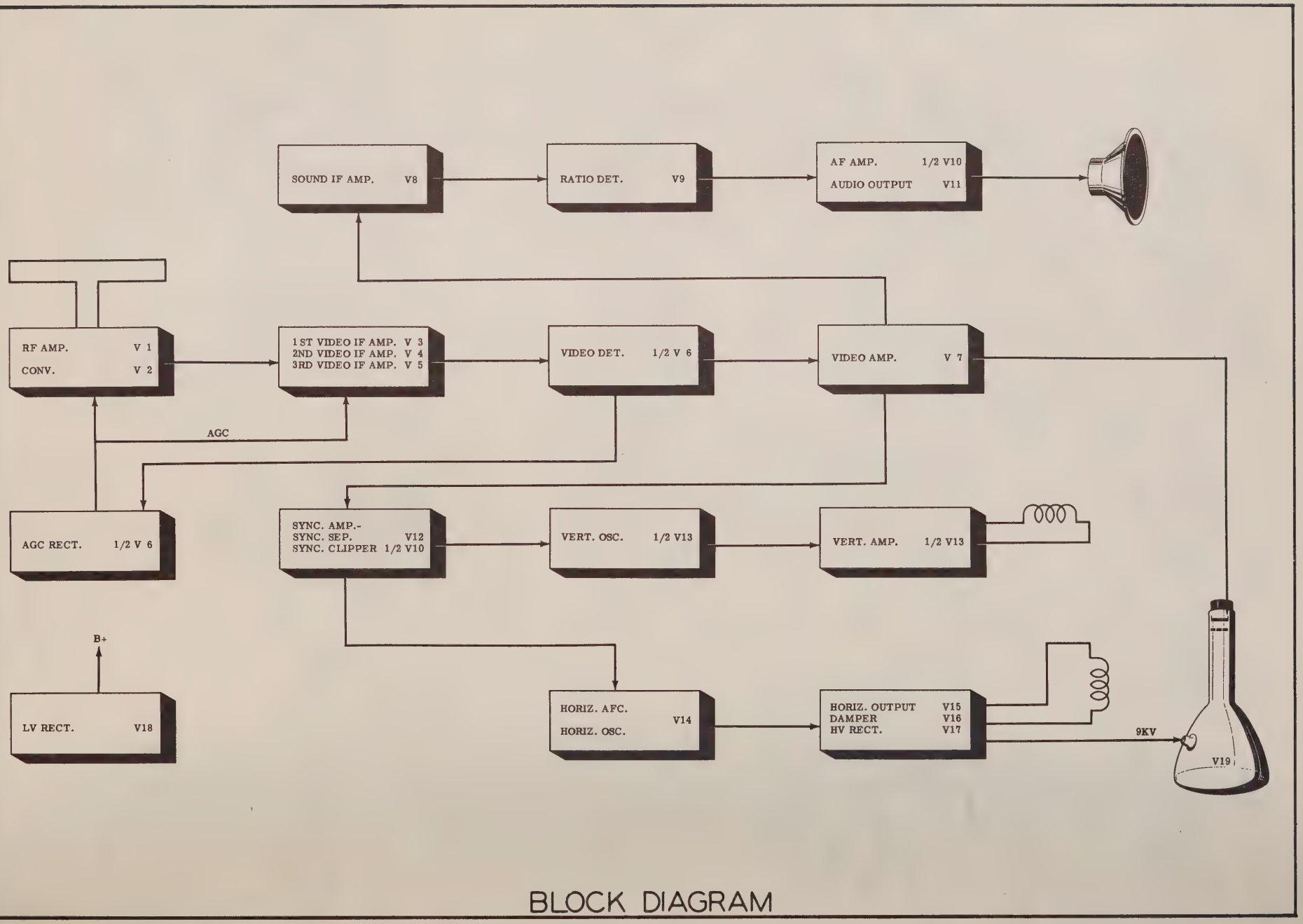
1. Remove radio and phono plugs from power chassis.
2. Remove pilot light from front of cabinet.
3. Remove four 5/16" hex head bolts holding chassis from inside record compartment. Remove chassis.

RADIO CHASSIS 5B2

1. Loosen three power supply cable clamps on cabinet and radio-phono unit. Pull cable through hole in cabinet.
2. Remove two screws holding loop antenna and unsolder both antenna leads. Remove loop.
3. Disconnect FM antenna leads at rear cabinet terminal. Remove two phillips head screws holding terminal.
4. Remove seven phillips head screws at sides and on underside of front radio housing.
5. Pull chassis foward until you can reach in and disconnect the phono pick-up and power plugs. Remove chassis.
6. Remove four push-on type control knobs from from of radio chassis.
7. Remove five phillips head screws on bottom of chassis holding front dial cover. Remove cover.



DIAL CORD STRINGING



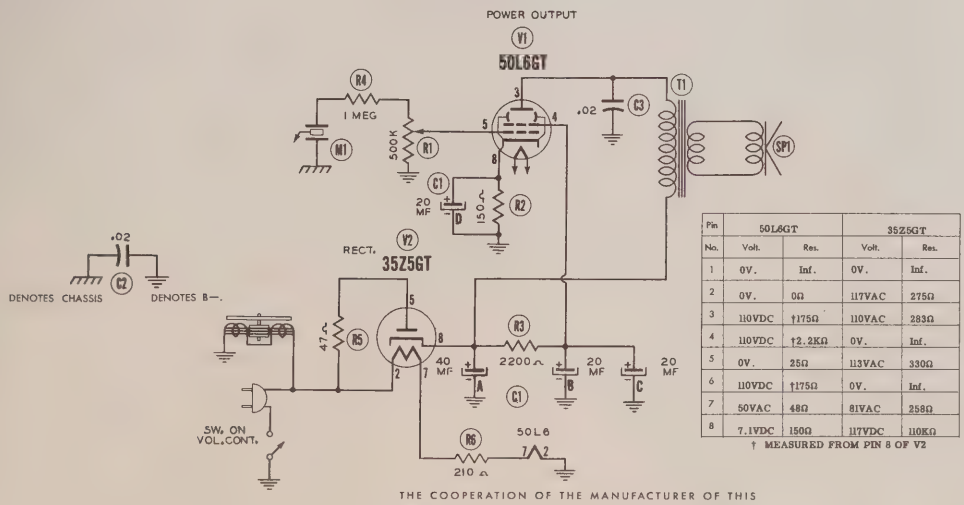
BLOCK DIAGRAM

AIRCASTLE
MODEL PM-78

AIRCASTLE
MODEL PM-78

AIRCASTLE MODEL PM-78

TRADE NAME	Aircastle, Model PM-78
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Illinois
TYPE SET	AC Operated Record Player with 2 Tube Amplifier
TUBES (TWO)	Types 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC
RATING	.23 Amp. at 117 Volts AC



Pin No.	50L6GT Volt.	50L6GT Res.	35Z5GT Volt.	35Z5GT Res.
1	0V.	Inf.	0V.	Inf.
2	0V.	0Ω	117VAC	275Ω
3	110VDC	†175Ω	110VAC	283Ω
4	110VDC	†2.2KΩ	0V.	Inf.
5	0V.	25Ω	113VAC	330Ω
6	110VDC	†175Ω	0V.	Inf.
7	50VAC	48Ω	81VAC	258Ω
8	7.1VDC	150Ω	117VDC	110KΩ

† MEASURED FROM PIN 8 OF V2

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100-2

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Power Output	50L6GT	50L6GT	7AC	
V2	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	150	1009	AF88D4A			EL-352	Filter-Red
B	20	150						Filter-Yellow
C	20	150						Filter-Yellow
D	20	25						Output Cathode Bypass-Blue
C2	.02	200	803	P488-02			TM-12	Line Isolation
C3	.02	200	808	P488-02			TM-12	Output Plate Bypass

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	401	Q13-133	15/16-60-Z	BSK-60-S	Volume control
B	Switch		Not Req.	76-1 *	SPST SW #	Not Req.	

* Attach to R1A per instructions
\# Attached at factory.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	150Ω	½	505	BW-½-150	Output Cathode
R3	2200Ω	½	504	BTS-2200	Filter
R4	1 Meg.	½		BTS-1 Meg.	Tone Compensation
R5	47Ω	½	520		Rect. Ballast
R6	210Ω	10	604		Filament Dropping-Wire Wound

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	2.1KΩ	3.8Ω	175Ω	.5Ω		A-3876 ①	A-2928 ①	RO-2 ①	① Bend mounting tabs down, file slots and remount on original brackets.

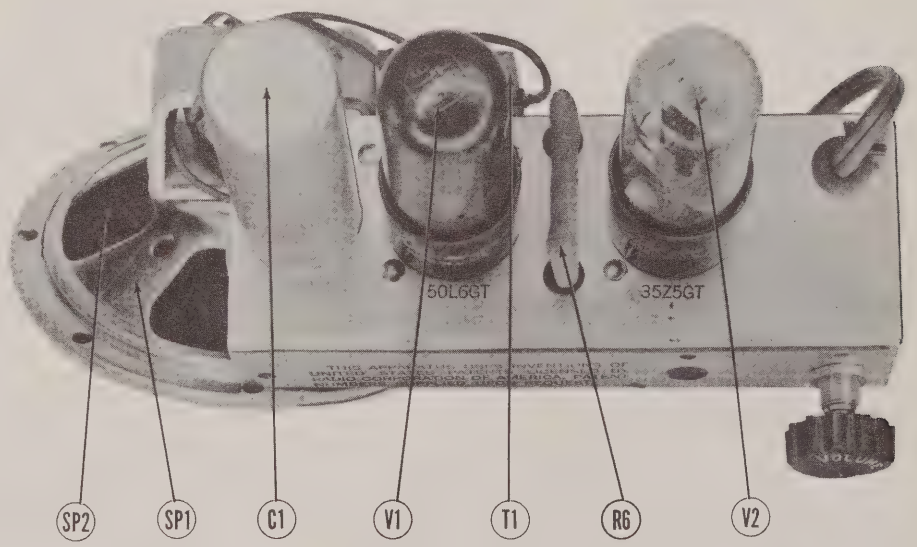
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-105 ②		
SP1	PM	3.8Ω	2601	MOD. P5-X	5A07 ②	② Remount output transformer.
	CONE DIA.	V. C. DIA.				
SP2	4 5/8"	9/16"				

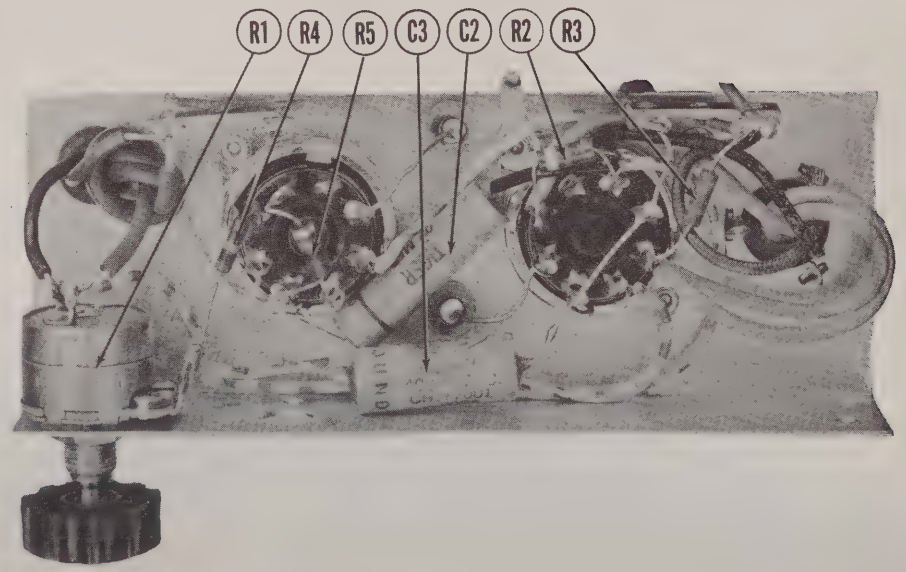
PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA: AIRCASTLE PART No.	ASTATIC PART No.: CARTRIDGE	ASTATIC PART No.: NEEDLE	SHURE PART No.: CARTRIDGE	SHURE PART No.: NEEDLE	REMARKS
M1	2522	L82A	Optional	W56A	Optional	
		510-L-72		96A		Tone Arm Assembly

CHASSIS—TOP VIEW

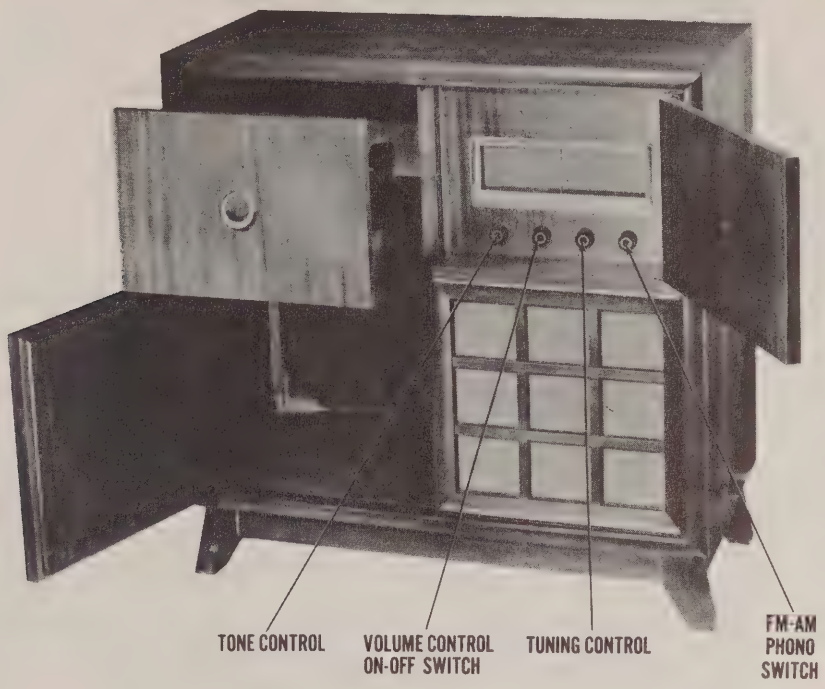


CHASSIS—BOTTOM VIEW



AIRLINE
MODEL 05WG-2752

AIRLINE
MODEL 05WG-2752

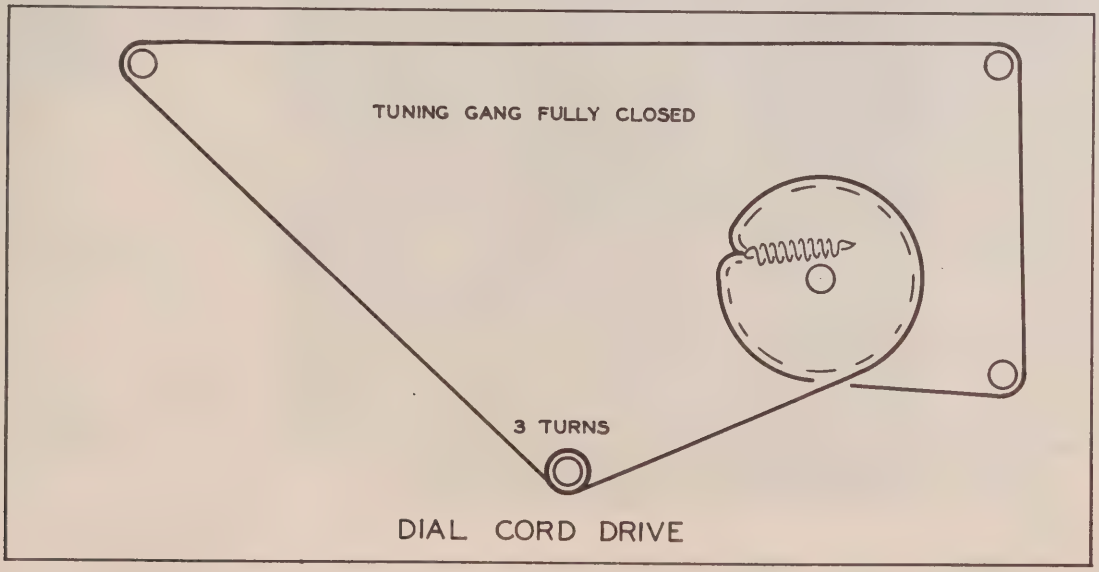


AIRLINE
MODEL 05WG-2752

AIRLINE MODEL 05WG-2752

TRADE NAME	Airline, Model 05WG-2752		
SUPPLIER	Montgomery Ward and Co., 619 Chicago Ave., Chicago, Illinois		
TYPE SET	AC Operated AM-FM-Phono Combination Superheterodyne Receiver with Loop Antenna		
TUBES (SEVEN)	Types 12AT7 FM RF Amp. & Mixer, 6BE6 FM Osc.-AM Converter, 6BA6 1st IF Amp., 6BA6 FM 2nd IF Amp., 6AL5 Ratio Det., 6AV6 DET-AVC-AF, 6V6GT Power Output, 5Y3GT Rectifier		
POWER SUPPLY	110-120 Volts AC	RATING	.56 Amp. at 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC	FREQ. MOD.	88-108MC

RECORD CHANGER - V-M MODEL 406



DIAL CORD DRIVE

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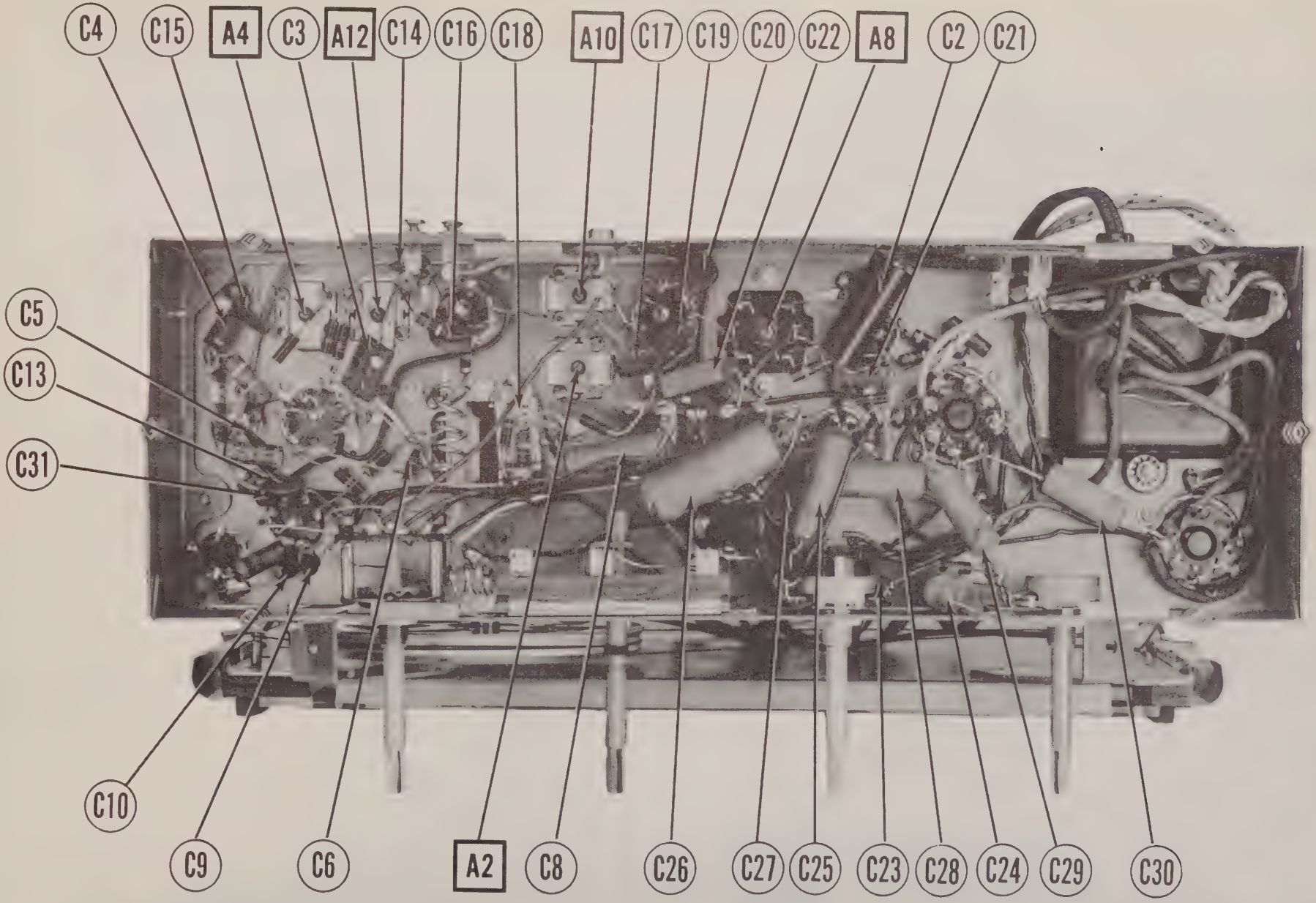
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C15
A4
C3
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C5
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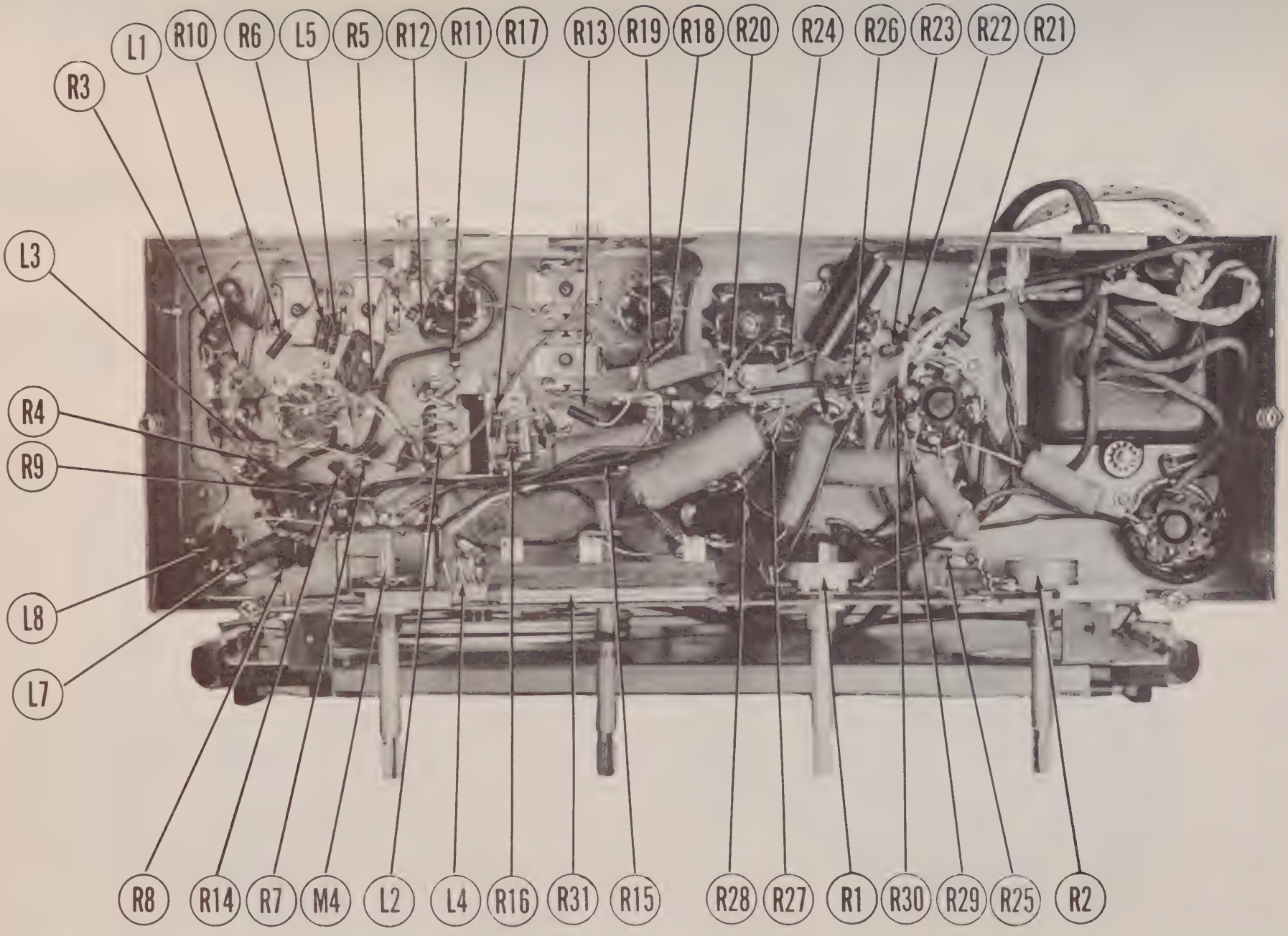
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R21
R3
L3
R4
R9
L8
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R8
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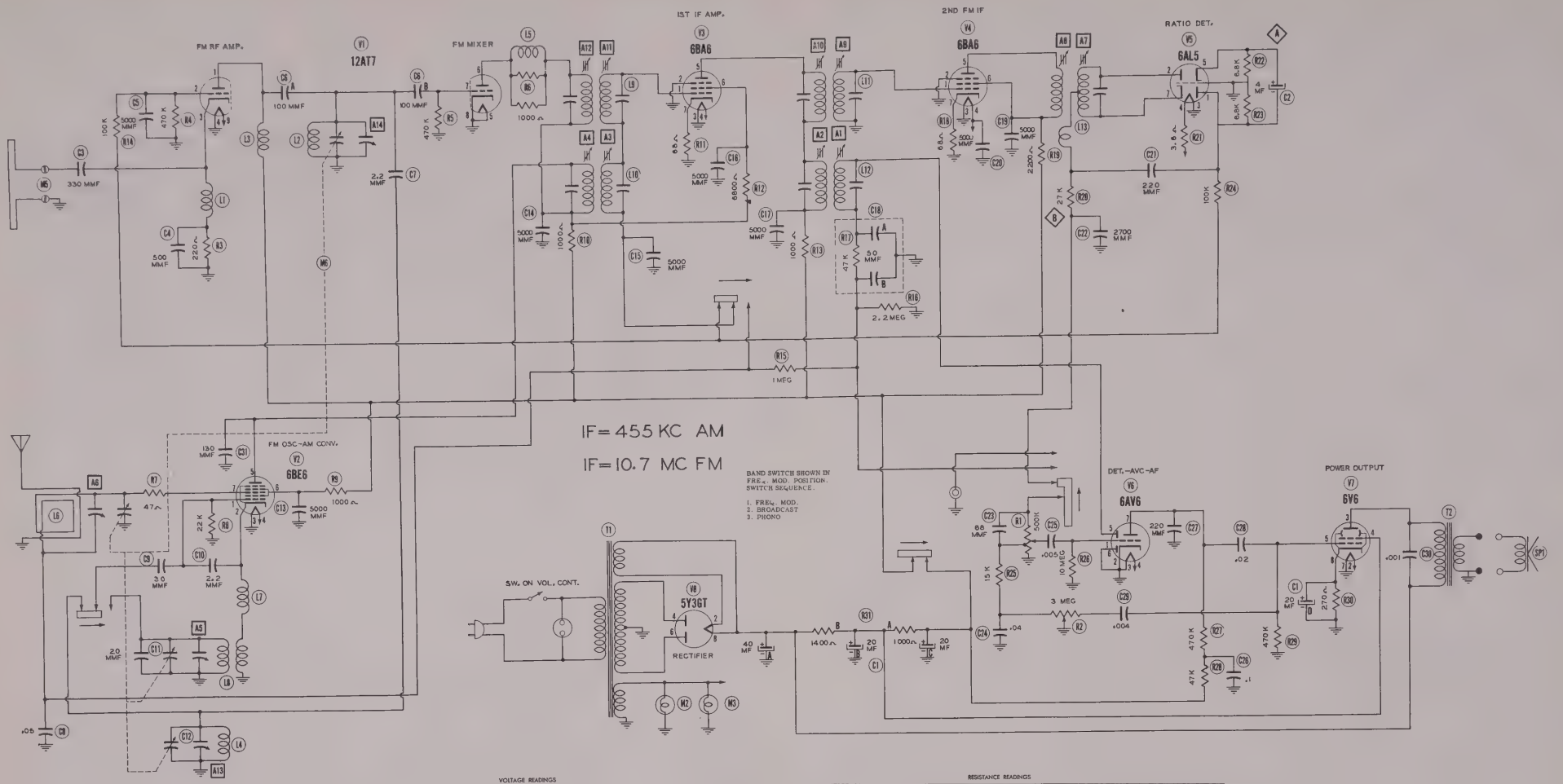
R30
R29
R25
R2



VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
†	V1	12AT7	130VDC	-.1VDC	1.2VDC	0V	0V	125VDC	-1.7VDC	0V	6.3VAC
†	V2A	6BE6	6-5.5VDC	0V	0V	6.3VAC	125VDC	125VDC	-1.2VDC		
#	V2B	6BE6	5-7VDC	0V	0V	6.3VAC	120VDC	125VDC	-.7VDC		
†	V3A	6BA6	-.1VDC	0V	0V	6.3VAC	125VDC	100VDC	.8VDC		
#	V3B	6BA6	-.6VDC	0V	0V	6.3VAC	125VDC	100VDC	.6VDC		
†	V4	6BA6	0V	0V	0V	6.3VAC	105VDC	105VDC	1VDC		
†	V5	6AL5	-2.8VDC	.6VDC	0V	5.4VAC	1.5VDC	0V	-3.2VDC		
#	V6	6AV6	-.7VDC	0V	0V	6.3VAC	0V	-.5VDC	65VDC		
#	V7	6V6GT	0V	6.3VAC	250VDC	185VDC	0V	0V	0V		
#	V8	5Y3GT	0V	260VDC	0V	260VAC	0V	260VAC	0V	260VDC	

† TAKEN IN FM POSITION
# V & R TAKEN IN BROADCAST POSITION
‡ TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
†	V1	12AT7	†2.4KΩ	150KΩ	220Ω	0Ω	0Ω	†3.4KΩ	470KΩ	0Ω	.1Ω
†	V2A	6BE6	22KΩ	2.2Ω	0Ω	.1Ω	†3.6KΩ	†3.6KΩ	3.2 Meg.		
#	V2B	6BE6	22KΩ	2.2Ω	0Ω	.1Ω	†3.6KΩ	†3.6KΩ	1.5 Meg.		
†	V3A	6BA6	90KΩ	0Ω	0Ω	.1Ω	†3.4KΩ	††0KΩ	68Ω		
#	V3B	6BA6	1.5 Meg.	0Ω	0Ω	.1Ω	†3.4KΩ	††0KΩ	68Ω		
†	V4	6BA6	1Ω	0Ω	0Ω	.1Ω	†4.6KΩ	†4.6KΩ	68Ω		
†	V5	6AL5	500KΩ	500KΩ	0Ω	1.8Ω	6.8KΩ	0Ω	6.8KΩ		
#	V6	6AV6	10 Meg.	0Ω	0Ω	.1Ω	0Ω	440KΩ	†330KΩ		
#	V7	6V6GT	Inf.	.1Ω	†440Ω	†1.4KΩ	470KΩ	.5Ω	0Ω	270Ω	
#	V8	5Y3GT	Inf.	50KΩ	Inf.	100Ω	Inf.	100Ω	Inf.	50KΩ	

† MEASURED FROM PIN 8 OF V8

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (Grid) of 6BE6 (V2). Low side to chassis.	455KC (400 ∿ Mod.)	AM (center)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	.1MFD	"	1620KC	"	"	"	A5	"
3.		Loop	1400KC	"	Tune for max. output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	2500MMF	High side to pin 7 (Grid) of 6BA6 (V4). Low side to chassis.	10.7MC (Unmod.)	FM (CW)	Tuning gang fully open	DC Probe to Point (A). Common to chassis.	A7	Adjust for maximum deflection.
5.	"	"	"	"	"	DC Probe to Point (B). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	"	High side to pin 1 (Grid) of 6BA6 (V3). Low side to chassis.	"	"	"	DC Probe to Point (A). Common to chassis.	A9, A10	Adjust for maximum deflection.
7.	"	High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis.	"	"	"	"	A11, A12	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	2500MMF	High side to pin 1 (Grid) of 6BA6 (V3). Low side to chassis.	10.7MC (450KC Sweep)	FM (CW)	Tuning gang fully open	Vert. Amp. to Point (A). Low side to chassis.	A7, A9 A10	Disconnect stabilizer cap. C2. Adjust for maximum amplitude and symmetry as per figure 1.
5.	"	High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis.	"	"	"	"	A11, A12	"
6.	"	"	"	"	"	Vert. Amp. to Point (B). Low side to chassis.	A8	Reconnect capacitor C2. Adjust A8 so 10.7MC occurs at center of crossover lines as per figure 2. Slightly retouch A7 for maximum amplitude and straightness of crossover lines. Continue with step 8.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	300Ω carbon res.	High side thru 300Ω to ungrounded FM antenna terminal.	108.5MC (Unmod.)	FM	Tuning gang fully open	DC Probe to Point (A). Common to chassis.	A13	Adjust for maximum deflection.
9.	"	"	104.5MC	"	Tune for max. deflection.	"	A14	"

FIG. 1

FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	FM RF Amp. -FM Mixer	12AT7	12AT7	9A	
V2	FM Osc. -AM Conv.	6BE6	6BE6	7CH	
V3	1st IF Amp.	6BA6	6BA6	7BK	
V4	2nd FM IF Amp.	6BA6	6BA6	7BK	
V5	Ratio Det.	6AL5	6AL5	6BT	
V6	DET. -AVC-AF	6AV6	6AV6	7BT	
V7	Power Output	6V6GT	6V6GT	7AC	
V8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

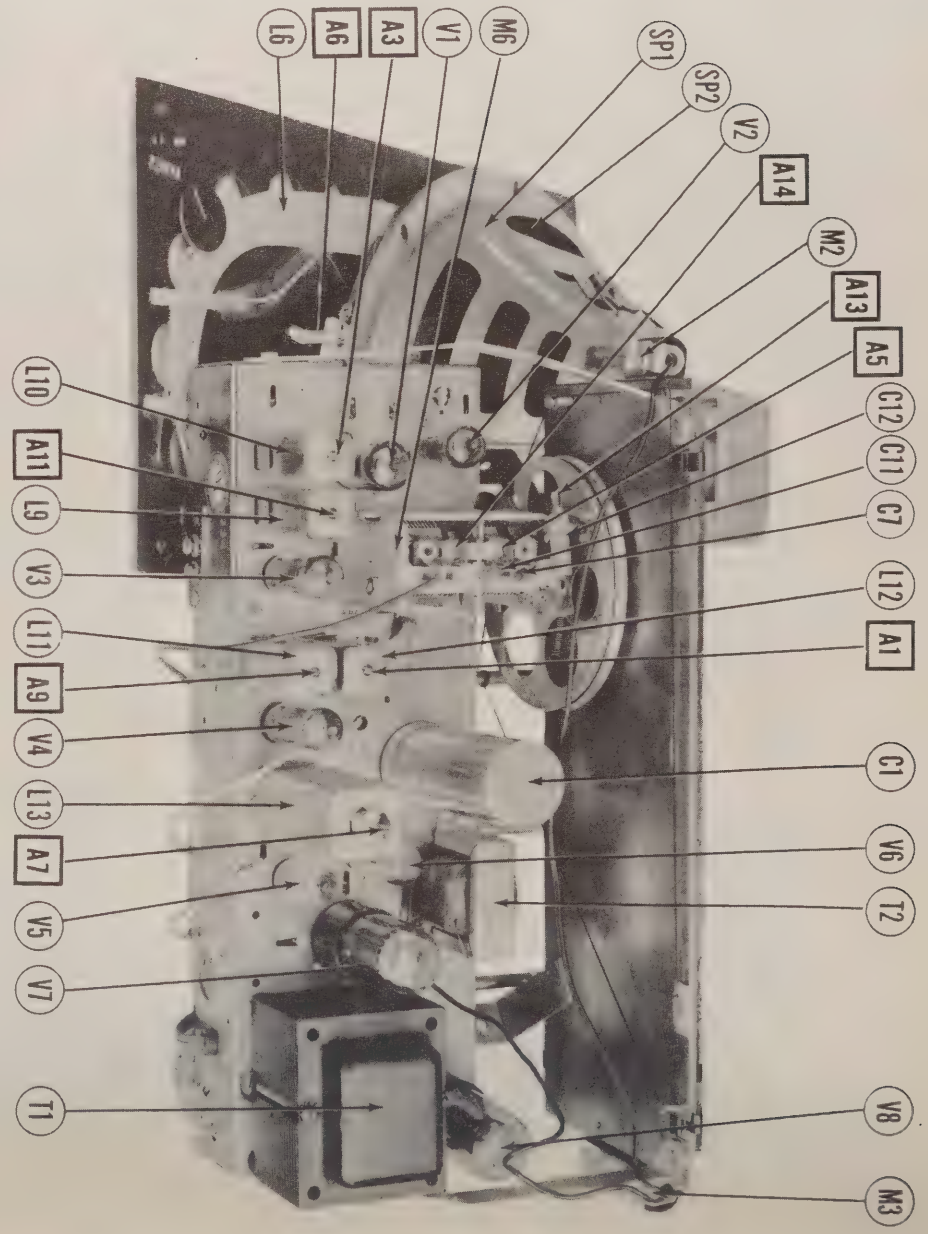
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	350	45X359	AF8H84G4A			EL-432	▪ Filter
B	40	350						■ Filter
C	20	350						▲ Filter
D	20	25						Output Cathode Bypass
C2	4	100	45X361	PRS150/4			UT-41	Stabilizing Cap.
C3	330	500	47X470	1468-00035	D6-331	GP2K-330	1FM-335	Ant. Coupling
C4	500		47X508	GP500M	D6-501	GP2K-500	1FM-35	FM RF Cathode Bypass
C5	5000		47X507	BPD-5	D6-502	811-005	29C1	FM RF Grid Filter
C6A	100		76X4	GP100M	D6-101	GP1K-100	1FM-31	RF Coupling
B	100			GP100M	D6-101	GP1K-100	1FM-31	RF Coupling
C7	2.2		47X557		D2-2.2			Osc. Coupling
C8	.05	200	B66503	P288-05			TM-15	AVC Filter
C9	30		47X558	GP30K	D6-330	GP1K-30	MS-43	Osc. Grid Cap.
C10	2.2		47X557		D2-2.2			Osc. Feedback
C11	20		47X516	GP20K	D2-20	NPOK-20	MS-42	Fixed Trimmer
C12	1-8		17A255			532-1-8		Variable Trimmer
C13	5000		47X507	BPD-5	D6-502	811-005	29C1	Osc. Anode Bypass
C14	5000		47X507	BPD-5	D6-502	811-005	29C1	Conv. Plate Decoupling
C15	5000		47X507	BPD-5	D6-502	811-005	29C1	AVC Filter
C16	5000		47X507	BPD-5	D6-502	811-005	29C1	1st IF Screen Bypass
C17	5000		47X507	BPD-5	D6-502	811-005	29C1	1st IF Plate Decoupling
C18A	50		47X112	GP50M	D6-500	GP1K-50	1FM-45	Diode RF Filter
B	50			GP50M	D6-500	GP1K-50	1FM-45	Diode RF Filter
C19	5000		47X507	BPD-5	D6-502	811-005	29C1	2nd IF Decoupling
C20	5000		47X507	BPD-5	D6-502	811-005	29C1	2nd IF Fil. Bypass
C21	220	500	47X468	1468-00025	D6-221	GP2K-220	1FM-325	Diode Load Cap.
C22	2700	500	47X492	1467-00025	D6-272	GP2M-0027	1FM-23	De-emphasis
C23	68	500	47X471	1468-000075	D6-680	GP1K-68	MS-47	Tone Compensation
C24	.04	400	B66403	P488-04			TM-14	Tone Compensation
C25	.005	400	D66502	P688-005	D6-502	811-005	TM-25	Audio Coupling
C26	.1	400	D66104	P488-1			TM-1	AF Amp. Plate Decoupling
C27	220	500	47X468	1468-00025	D6-221	GP2K-220	1FM-325	AF Amp. Plate Bypass
C28	.02	400	D66203	P488-02			TM-12	Audio Coupling
C29	.004	600	B66402	P688-004		GP2M-004	TM-24	Tone Compensation
C30	.001	800	H66102	1084-001			TR-21	Output Plate Bypass
C31	130		47X559	SI130JN750	DN-130	N750L-130		Fixed Trimmer

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	36X372	Q13-133X	AT-78	BTSK-66-S	Volume control, tapped at 100KΩ
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SW-A	Not Req.	Attach to R1A per instructions
R2A	3 Meg.	½	40X285	Q13-140	AM-67-Z	AN-85	Tone control
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Attach to R2A per instructions

SET 100 FOLDER 3

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	
R3	220Ω	½	B84221		FM RF Cathode
R4	470KΩ	½	B85474	BTS-470K	FM RF Grid
R5	470KΩ	½	B85474	BTS-470K	FM Mixer Grid
R6	1000Ω	½			Parasitic Supp. -See Note
R7	47Ω	½	B85470		Parasitic Supp.
R8	22KΩ	½	B85223	BTS-22K	Osc. Grid
R9	1000Ω	½	B85102	BTS-1000	Osc. Anode
R10	1000Ω	½	B85102	BTS-1000	Conv. Plate Decoupling
R11	68Ω	½	B84680		1st IF Cathode
R12	6800Ω	½	B84682	BTS-6800	1st IF Screen
R13	1000Ω	½	B85102	BTS-1000	1st IF Plate Decoupling
R14	100KΩ	½	B85104	BTS-100K	AVC Network
R15	1 Meg.	½	B85105	BTS-1 Meg.	AVC Network
R16	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Diode Load
R17	47KΩ	½	B85473	BTS-47K	Diode Filter
R18	68Ω	½	B84680		FM 2nd IF Cathode
R19	2200Ω	½	B85222	BTS-2200	FM 2nd IF Decoupling
R20	27KΩ	½	B85273	BTS-27K	De-emphasis
R21	3.6Ω	½	43X233		Ratio Det. Filament-Wire Wound
R22	6800Ω	½	B84682	BTS-6800	Ratio Det. Diode Load
R23	6800Ω	½	B84682	BTS-6800	Ratio Det. Diode Load
R24	100KΩ	½	B85104	BTS-100K	AVC Network
R25	15KΩ	½	B85153	BTS-15K	Tone Compensation
R26	10 Meg.	½	B85106	BTS-10 Meg.	AF Amp. Grid
R27	470KΩ	½	B85474	BTS-470K	AF Amp. Plate
R28	47KΩ	½	B85473	BTS-47K	AF Amp. Plate Decoupling
R29	470KΩ	½	B85474	BTS-470K	Output Grid
R30	270Ω	½	B84271	BW-½-270	Output Cathode
R31A	1000Ω	4	43X224		Filter-Wire Wound
B	1400Ω	6			Filter-Wire Wound

Note. Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .58A	510VCT .087ADC	5VAC @ 2A	6.3VAC @ 2A	53X290			PH-70B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	5.3KΩ	3.2Ω	440Ω	.8Ω	51X134	A-3849	A-3019	RO-9 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	V. C. IMP.	AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	3.2Ω	12A490	ST-120 ② MOD. P12-S	12A6A	② Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	V. C. DIA.				
SP2	11 1/2"	1"				

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	
L1	FM Ant.	0Ω		35A9		
L2	FM RF	0Ω		9A2066		
L3	RF Choke	3Ω		35A8		
L4	FM Osc.	0Ω		9A2067		
L5	Para. Supp.	.1Ω		9A2068		Wound on 1KΩ resistor
L6	Loop Ant.	0Ω	.8Ω	9A1972		
L7	RF Choke	1.8Ω		35A5		
L8	AM Osc.	.5Ω	5.2Ω	9A2065	14-1073	
L9	1st FM IF	1Ω	1Ω	9A2060	16-3487	
L10	1st AM IF	13Ω	15Ω	9A2062	16-6758	
L11	2nd FM IF	1Ω	1Ω	9A2061	15-3487	
L12	2nd AM IF	13Ω	14.8Ω	9A2063	16-6758	
L13	Ratio Det. Trans.	1.2Ω	.1Ω	9A2064	17-3487	

PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA					REMARKS
	AIRLINE PART No.	ASTATIC PART No.		SHURE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		AC-AG-J	A-AG	W26B	A66U	

DIAL LIGHTS

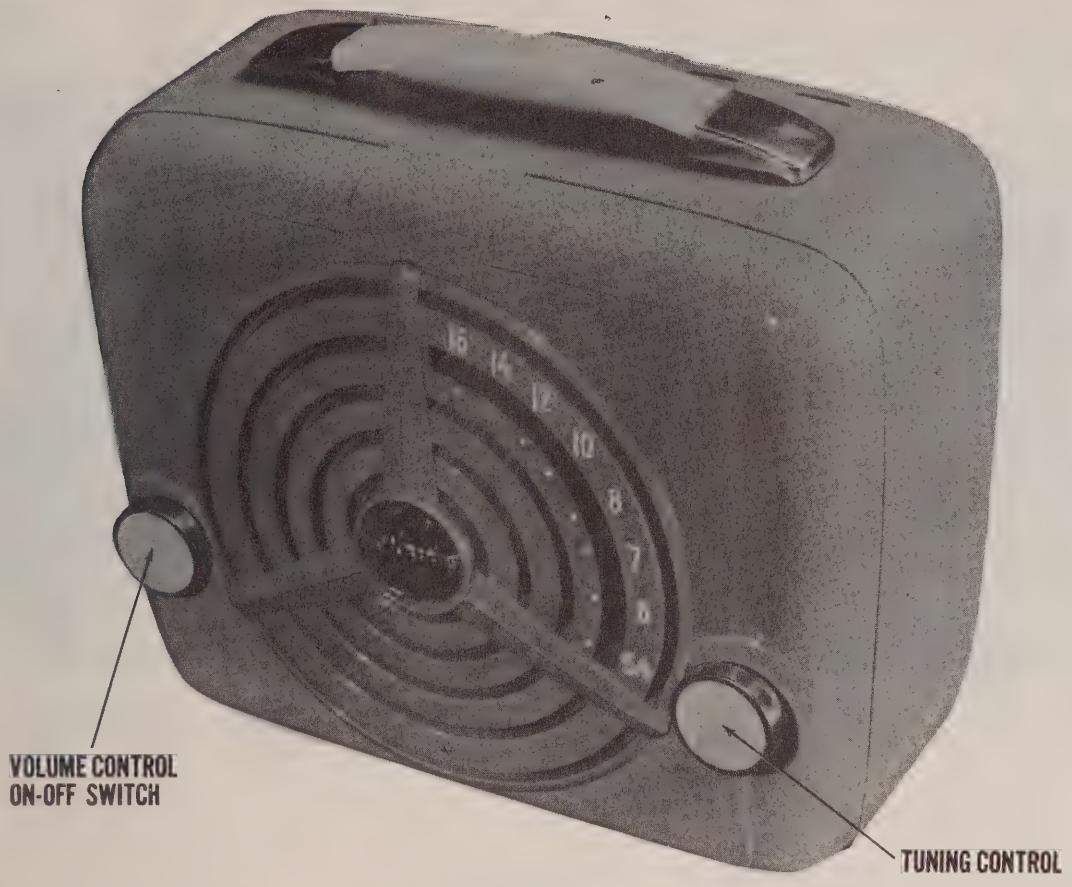
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					AIRLINE PART No.		
M2	Bayonet	6-8	.15	Brown	7A103		Type #47
M3	Bayonet	6-8	.15	Brown	7A103		Type #47

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Switch	2A393	FM-AM-Phono
M5	FM Antenna	9A2004	Built-In
M6	Tuning Gang	14A209	(17-507MMF, 14-187MMF)
A6	Trimmer	17A256	AM Ant. Adj.
A13	Trimmer	17A255	FM Osc. Adj.
	Dial Glass	58X729	
	Pointer	15X251	
	Knob	10A754	4 used
	Phono Motor	V-2727B	

ARVIN MODELS 350-PB, 350-PL, 351-PB, 351-PL, 352-PL, 353-PL

ARVIN MODELS 350-PB, 350-PL, 351-PB, 351-PL, 352-PL, 353-PL



ARVIN MODELS 350-PB, 350-PL, 351-PB, 351-PL, 352-PL, 353-PL

ARVIN MODEL 350PL

TRADE NAME	Arvin Models 350PB, 350PL, 351PB, 351PL, 352PL, 353PL (Ch. RE-267-1, RE-267-2)
MANUFACTURER	Noblitt-Sparks Industries Inc., Columbus, Indiana
TYPE SET	Three Power Portable Superheterodyne Receiver
TUBES(FIVE)	Types 1U4 RF Amp., 1R5 Converter, 1U4 IF Amp., 1U5 DET-AVC-AF, 3V4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 90 Volts DC "B" Supply and 9 Volts DC "A" Supply
RATING	.16 Amp. at 117 Volts AC or 13MA at 90 Volts DC and 68MA at 9 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer to last reference mark on pointer back plate.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 6 (Grid) of 1R5 (V2). Low side to B-.	455KC (400 ∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy antenna to 200MMF to reduce hum modulation.
2.	.01MFD	High side to pin 6 (Grid) of 1U4 (V1). Low side to B-.	455KC	"	"	A5	Adjust for MINIMUM output.
3.	.01MFD	"	1620KC	"	"	A6	Adjust for maximum output.
4.		Loop	1400KC	1400KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

ARVIN
MODEL 350PL

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ARVIN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	1U4	1U4	6AR	
V2	Converter	1R5	1R5	7AT	
V3	IF Amp.	1U4	1U4	6AR	
V4	DET.-AVC-AF	1U5	1U5	6BW	
V5	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	150	A22879 ‡	AF842J20B				▲ Filter
B	30	150						■ Filter
C	20	150						▲ Filter
D	100	10						Filament Bypass
C1A	40	150	A21815 §	AF84D20A			EL-351	■ Filter
C	20	150						▲ Filter
D	100	10						Filament Bypass
C1B	30	150	A21675 §	PRS150/30			UT-301	Filter
C2	5000		A21674	BPD-5	D6-502	811-005	29C1	AVC Filter
C3	.05	200	C20272-503	P288-05			68P16	Filament Bypass
C4	50	500	C20065-500	1468-00005	D6-500	GPIK-50	1FM-45	RF Coupling
C5	50	500	C20065-500	1468-00005	D6-500	GPIK-50	1FM-45	Osc. Grid Cap.
C6	5000		A21674	BPD-5	D6-502	811-005	29C1	AVC Filter
C7	.05	200	C20272-503	P288-05			68P16	Osc. Anode Bypass
C8	.05	200	C20272-503	P288-05			68P16	Filament Bypass
C9	10000		A22295	BPD-10	D6-103	811-01	36C1	AVC Filter
C10A	50		*	GP50M	D6-500	GPIK-50	1FM-45	Diode RF Filter
B	50			GP50M	D6-500	GPIK-50	1FM-45	Diode RF Filter
C11	.01	200	C20272-103	P488-01	D6-103	811-01	68P14	Audio Coupling
C12A	5000		†	BPD-5	D6-502	811-005	29C1	AF Amp. Screen Bypass
B	50			GP50M	D6-500	GPIK-50	1FM-45	AF Amp. Plate Bypass
C	2000			GP2000M	D6-202	GP2M-002	68P27	Audio Coupling
C13	.006	400	C20273-602	P488-006	D6-562		68P6	Output Plate Bypass
C14	.05	200	C20067-503	P288-05			TM-15	Line Filter
C15	.1	400	C20273-104	P488-1			72P52	Line Isolation

* Items C10A, C10B and R10 are combined into one unit obtainable under MFGR'S Part No. A22902.
† Items C12A, C12B, C12C, R13A, R13B, and R13C are combined into one unit obtainable under MFGR'S Part No. A22257
‡ Used only in chassis RE-267-2.
§ Used only in chassis RE-267-1.

CONTROLS

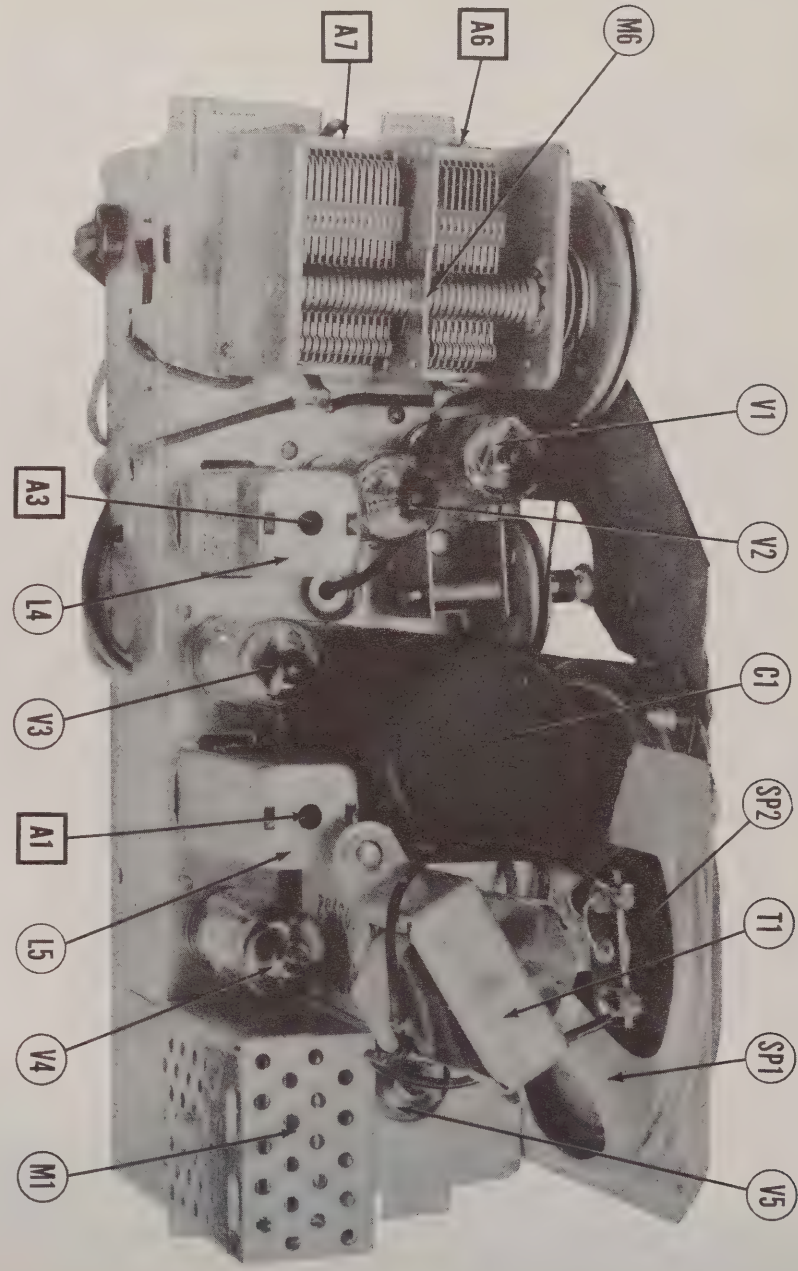
ITEM No.	RATING RESISTANCE	RATING WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	2 Meg.	½	C22253	Q13-139	15/16-66-Z.		Volume control
B	Switch		Not Req.	76-2	DPST SW *		Attach to R1A per instructions

* Switch attached at factory.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	ARVIN PART No.	IRC PART No.	IDENTIFICATION CODES
R2	10 Meg.	½	C20245-106	BTS-10 Meg.	AVC Network-See Note 1
R3	3.3 Meg.	½	C20245-335	BTS-3.3 Meg.	AVC Network-See Note 1
R4	3.3 Meg.	½	C20245-335	BTS-3.3 Meg.	AVC Network-See Note 1
R5	6800Ω	½	C20060-682	BTS-6800	RF Transformer Shunt-See Note 2
R6	100KΩ	½	C20060-104	BTS-100K	Osc. Grid
R7	6800Ω	½	C20060-682	BTS-6800	Osc. Anode-See Note 3
R8	1000Ω	½	C20060-102	BTS-1000	Filament String
R9	3.3 Meg.	½	C20245-335	BTS-3.3 Meg.	AVC Network-See Note 1
R10	47KΩ	½	¶	BTS-47K	Diode Filter
R11	10 Meg.	½	C20271-106	BTS-10 Meg.	AVC Network-See Note 4
R12	10 Meg.	½	C20060-106	BTS-10 Meg.	AF Amp. Grid
R13A	4.7 Meg.	½	§	BTS-4.7 Meg.	AF Amp. Screen
B	1 Meg.	½	§	BTS-1 Meg.	AF Amp. Plate
C	2.2 Meg.	½	§	BTS-2.2 Meg.	Output Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R14	1000Ω	½	C20060-102	BTS-1000	Filament String
R15	680Ω	1	C20070-681	BTA-680	Filter
R16	3300Ω	½	C20060-332	BTS-3300	Filament String
R17	1850Ω	10	A21816		Filament Dropping-Wire Wound
R18	250Ω	2	A22777	BW-2-270	Filter-Wire Wound
R19	47Ω	1	A19177		Surge Limiter-Wire Wound
R20	4.7 Meg.	½	C20271-475	BTS-4.7 Meg.	AVC Network-See Note 4

¶ Items C10A, C10B and R10 are combined onto one unit obtainable under MFGR'S Part No. A22902.
§ Items C12A, C12B, C12C, R13A, R13B and R13C are combined into one unit obtainable under MFGR'S Part No. A22257.
Note 1. Chassis RE-267-1 use 4.7 Meg. resistor in this application.
Note 2. Chassis RE-267-1 use 15KΩ resistor in this application.
Note 3. Chassis RE-267-1 use 22KΩ resistor in this application.
Note 4. Used in chassis RE-267-1 only.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ARVIN PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	8600Ω	3.7Ω	390Ω	.4Ω		A-3329 ①	A-2932 ①	RO-16 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-113 ②		
SP1	PM	3.7Ω		MOD. P4-X	4A07 ②	② Remount output transformer
	CONE DIA.	V. C. DIA.				
SP2	4"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	
L1A	Loop Ant.	1.2Ω		AD22258-4		Includes cabinet back Blue-Green
B	Loop Ant.			AD22258-3		Includes cabinet back Jade-Green
C	Loop Ant.			AD22258-1		Includes cabinet back Sandelwood
D	Loop Ant.			AD22258-2		Includes cabinet back Burgundy
L2A	RF Coil	18Ω	18Ω	AC22912-1	14-1071	Models 350PL, 351PL, 352PL, 353PL
B	RF Coil			AC22256-1		Models 350PB, 351PB
L3	Osc. Coil	2Ω	8Ω	AC22255-1	14-1074	
L4	1st IF	13Ω	13Ω	C21797-5	16-6668	
L5	2nd IF	27Ω	27Ω	C21797-2	16-6669	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	ARVIN PART No.	SYLVANIA PART No.		
M1	.070ADC		NC-5		

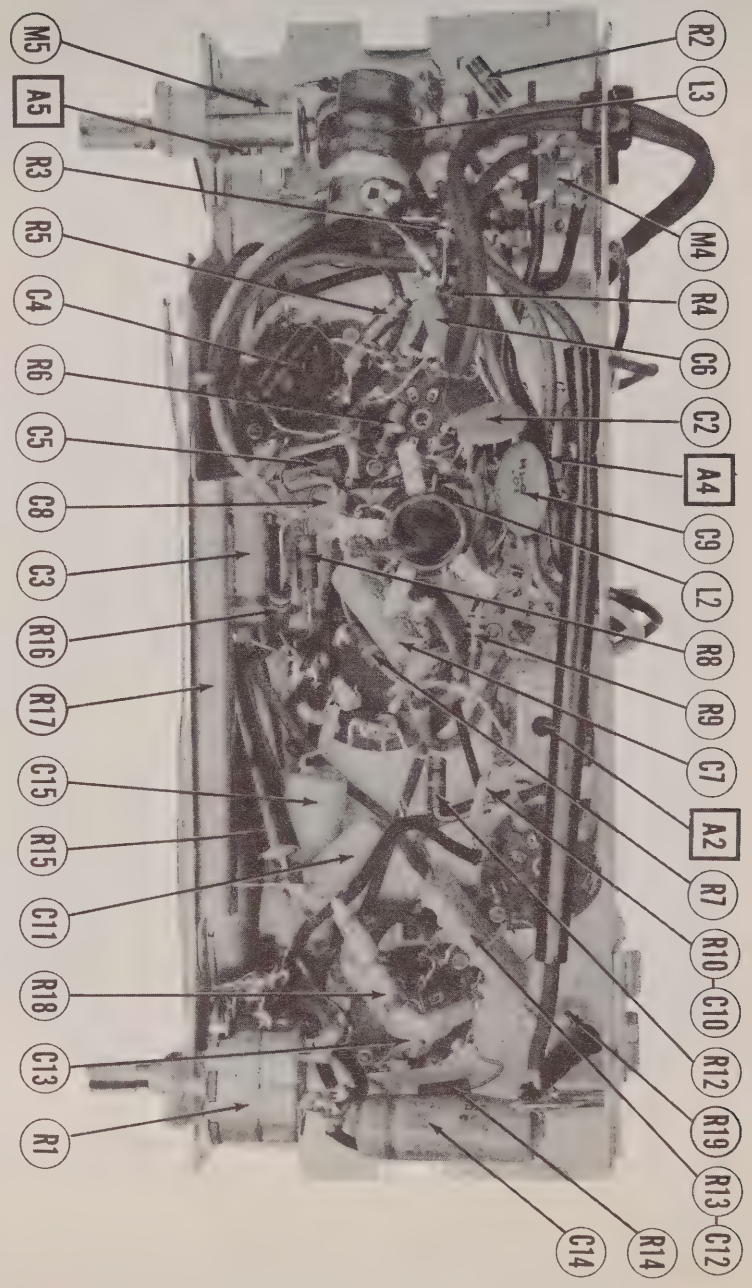
BATTERIES

ITEM No.	VOLTAGE	ARVIN PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	1.5 V "A"		935			1			6 required
M3	90V "B"			490			N-60		

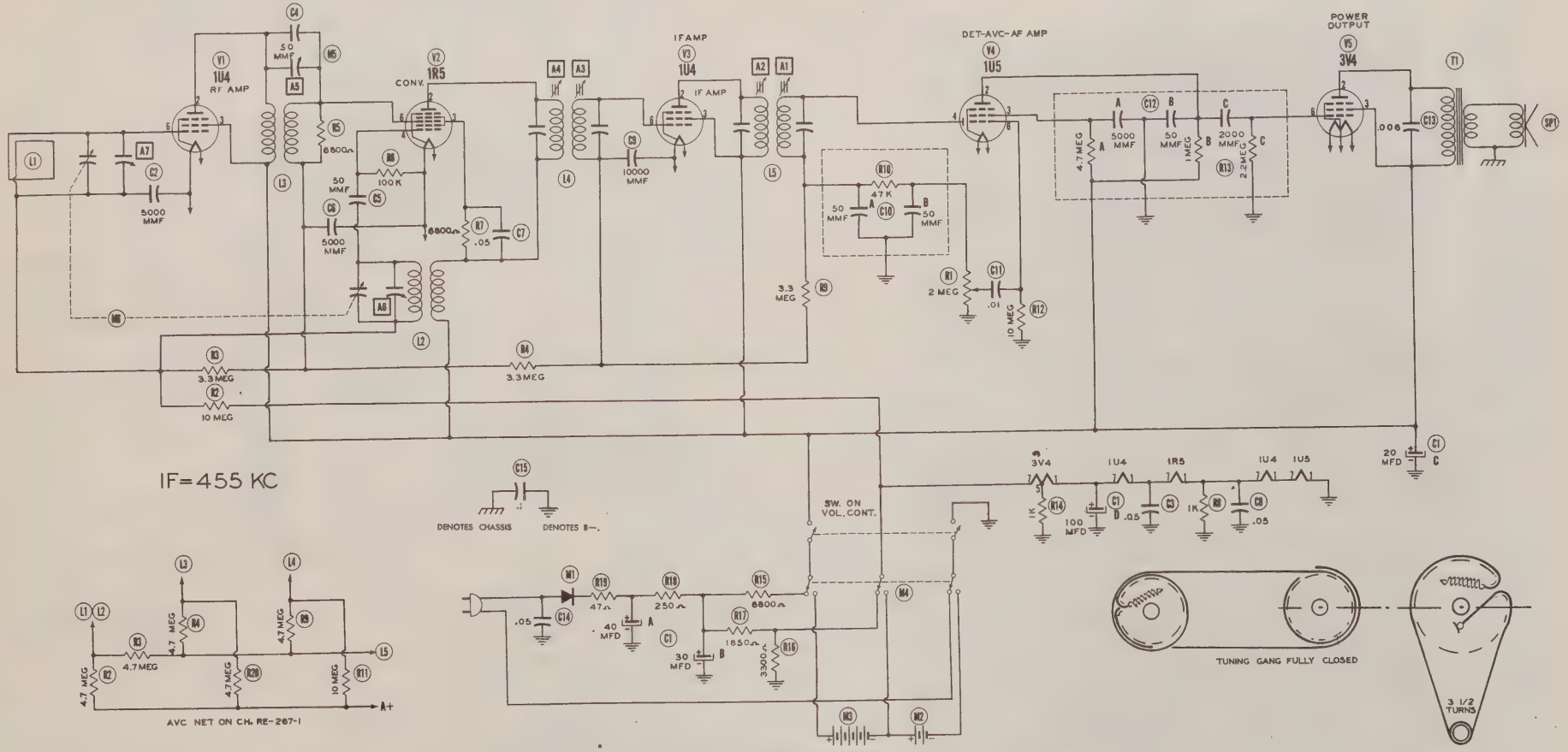
MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M4	Switch		Power Change-Over
M5	Trimmer	A20275	RF Coil Adj. (A5)
M6	2 Gang Var. Cap.	AC22277-1	Chassis RE-276-1
	2 Gang Var. Cap.	AC22277	Chassis RE-276-2
	Cabinet	AA22380-3	Sandelwood
	Cabinet	AA22380-4	Burgundy

CHASSIS—BOTTOM VIEW



ARVIN MODEL 350PL



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	4.3VDC	90VDC	90VDC	0V.	4.3VDC	.2VDC	5.8VDC
V 2	1R5	2.8VDC	90VDC	75VDC	8-26VDC	2.8VDC	.2VDC	4.3VDC
V 3	1U4	1.5VDC	90VDC	90VDC	0V.	1.5VDC	.1VDC	2.8VDC
V 4	1U5	0V.	19VDC	16VDC	-.1VDC	0V.	0V.	1.5VDC
V 5	3V4	5.8VDC	90VDC	90VDC	120VDC	7.8VDC	0V.	9VDC

* TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	*	†1000Ω	†1000Ω	Inf.	*	5 Meg.	*
V 2	1R5	*	†1000Ω	†7000Ω	100KΩ		5 Meg.	*
V 3	1U4	*	†1000Ω	†1000Ω	Inf.	*	4 Meg.	*
V 4	1U5	*	†1 Meg.	†4.7 Meg.	2 Meg.	2 Meg.	10 Meg.	*
V 5	3V4	*	†1400Ω	†1000Ω	†47Ω	*	2.2 Meg.	*

† MEASURED FROM OUTPUT OF M1.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DEWALD
MODEL D-518

DEWALD
MODEL D-518

TRADE NAME	Dewald, Model D-518
MANUFACTURER	Dewald Radio Mfg. Co., 35-15 37th Ave., Long Island City, New York
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 12BE6 Converter, 12BA6 IF Amp., 12AT6 DET-AVC-AF, 50B5 Power Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .26 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	530-1690KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer to reference mark at low frequency end of dial back plate.

Use isolation transformer if available. If not connect a .1MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (Grid) of 12BE6 (V1) Low side to chassis.	455KC (400 ∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	.01MFD	"	1690KC	"	"	A5	"
3.		Loop	1400KC	Tune for max. output.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	DET.-AVC-AF	12AT6	12AT6	7BT	
V4	Power Output	50B5	50B5	7BZ	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DEWALD PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	150		PRSA150/30-30			TA-330	Filter
B	30	150						Filter
C2	.05	400		P488-05			TM-15	AVC Filter
C3	.05	400		P488-05			TM-15	RF Bypass
C4	220			GP220M	D6-221	GP2K-220	1FM-325	Diode RF Filter
C5	.005	400		P688-005	D6-502	811-005	TM-25	Audio Coupling
C6	100			GP100M	D6-101	GP1K-100	1FM-31	AF Amp. Plate Bypass
C7	.01	400		P488-01	D6-103	811-01	TM-11	Audio Coupling
C8	.02	400		P488-02			TM-12	Output Plate Bypass
C9	.05	400		P488-05			TM-15	Line Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DEWALD PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½		Q13-133	AM-60-Z	BSK-60-S	Volume control and switch
B	Switch			76-1	SW-A	Not Req.	Attach to R1A per instructions
C	Shaft			Not Req.	KSS-3	Not Req.	Attach to R1A per instructions

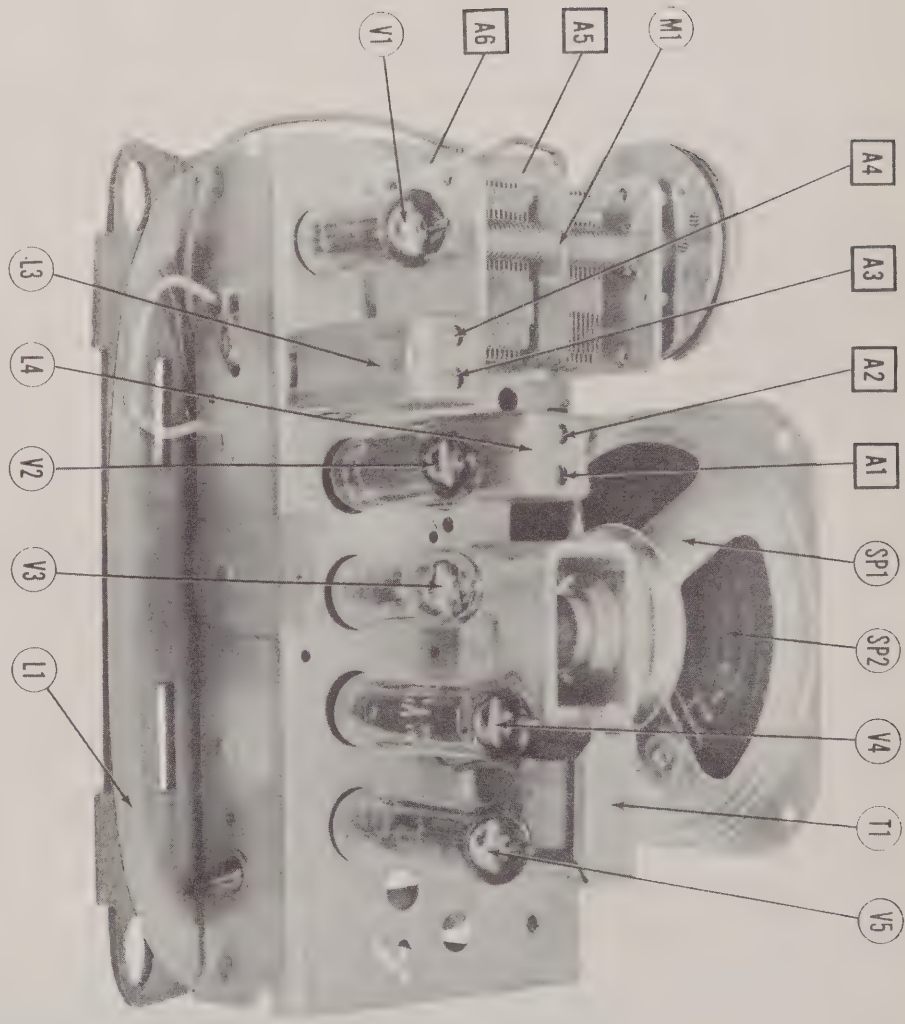
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DEWALD PART No.	IRC PART No.	IDENTIFICATION CODES
R2	22KΩ	½		BTS-22K	Osc. Grid
R3	150Ω	½		BW-½-150	IF Cathode
R4	100Ω	½		BW-½-100	IF Cathode
R5	2.2 Meg.	½		BTS-2.2 Meg.	AVC Network
R6	4.7 Meg.	½		BTS-4.7 Meg.	AF Grid
R7	470KΩ	½		BTS-470K	AF Plate
R8	470KΩ	½		BTS-470K	Output Grid
R9	150Ω	½		BW-½-150	Output Cathode
R10	1.5KΩ	1		BTA-1.5K	Filter

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: DEWALD PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	2400Ω	3Ω	180Ω	.5Ω		A-3876 ①	A-2928 ①	RO-2 ①	① Bend mounting tabs down and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

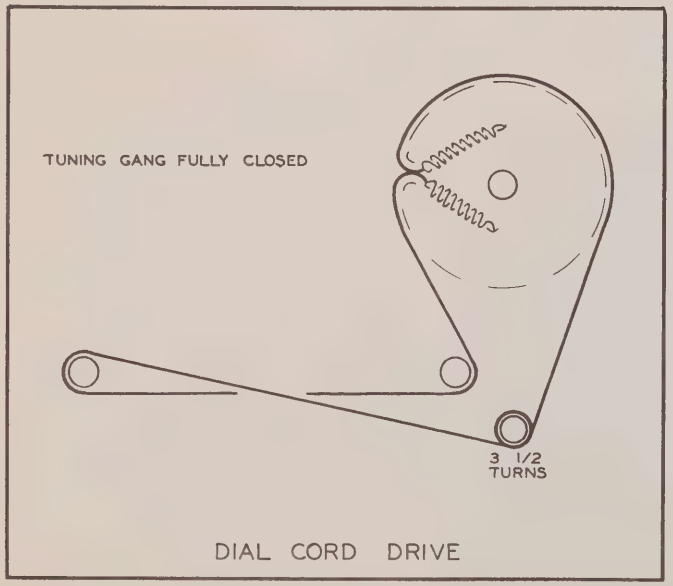
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DEWALD PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.				
SP1	PM	3Ω			4A07 ②	② Remount output transformer.
	CONE DIA.	V. C. DIA.				
SP2	4"	9/16"				

R F COILS

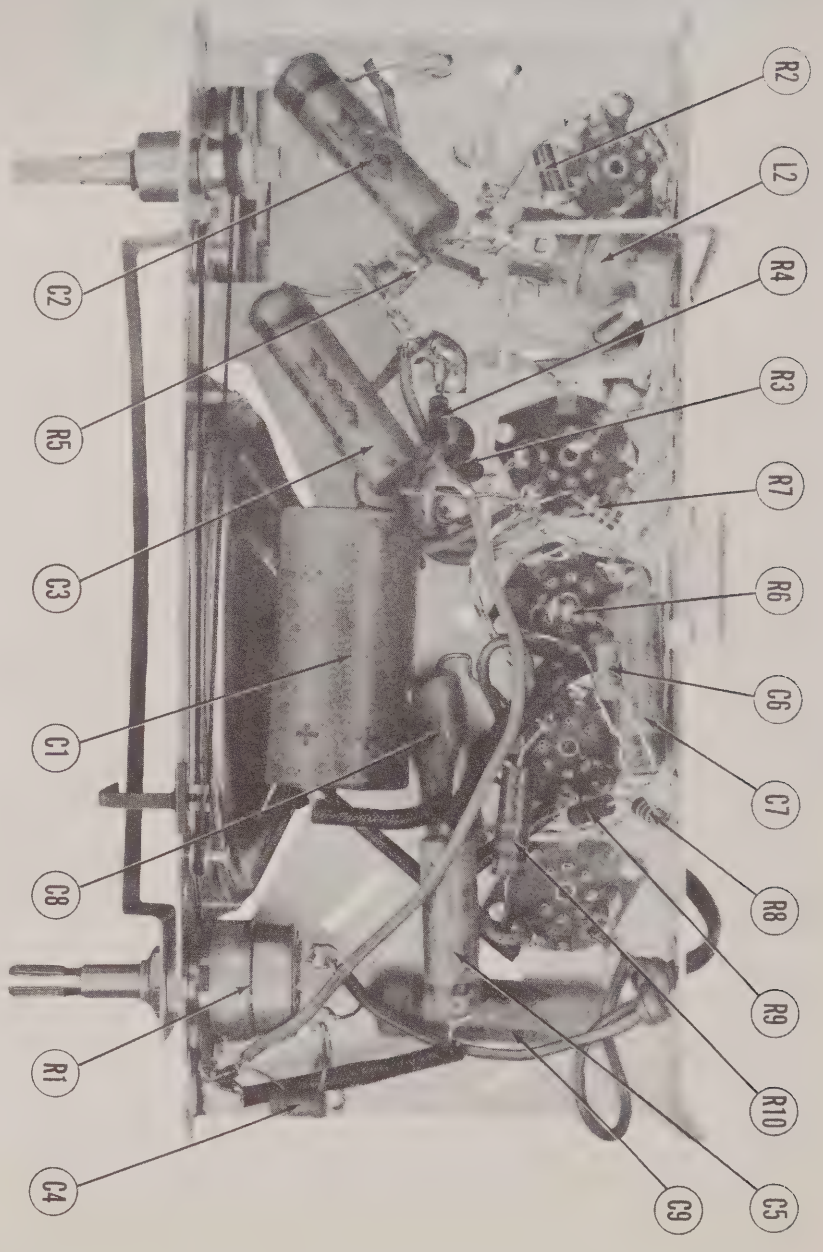
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	DEWALD PART No.	MEISSNER PART No.	
L1	Loop Ant.	3Ω				
L2	Osc. Coil	6.4Ω			14-1073	Tap at .9Ω
L3	1st IF	15Ω	15Ω	1046-1	16-6678	
L4	2nd IF	15Ω	15Ω	1046-1	16-6678	

MISCELLANEOUS

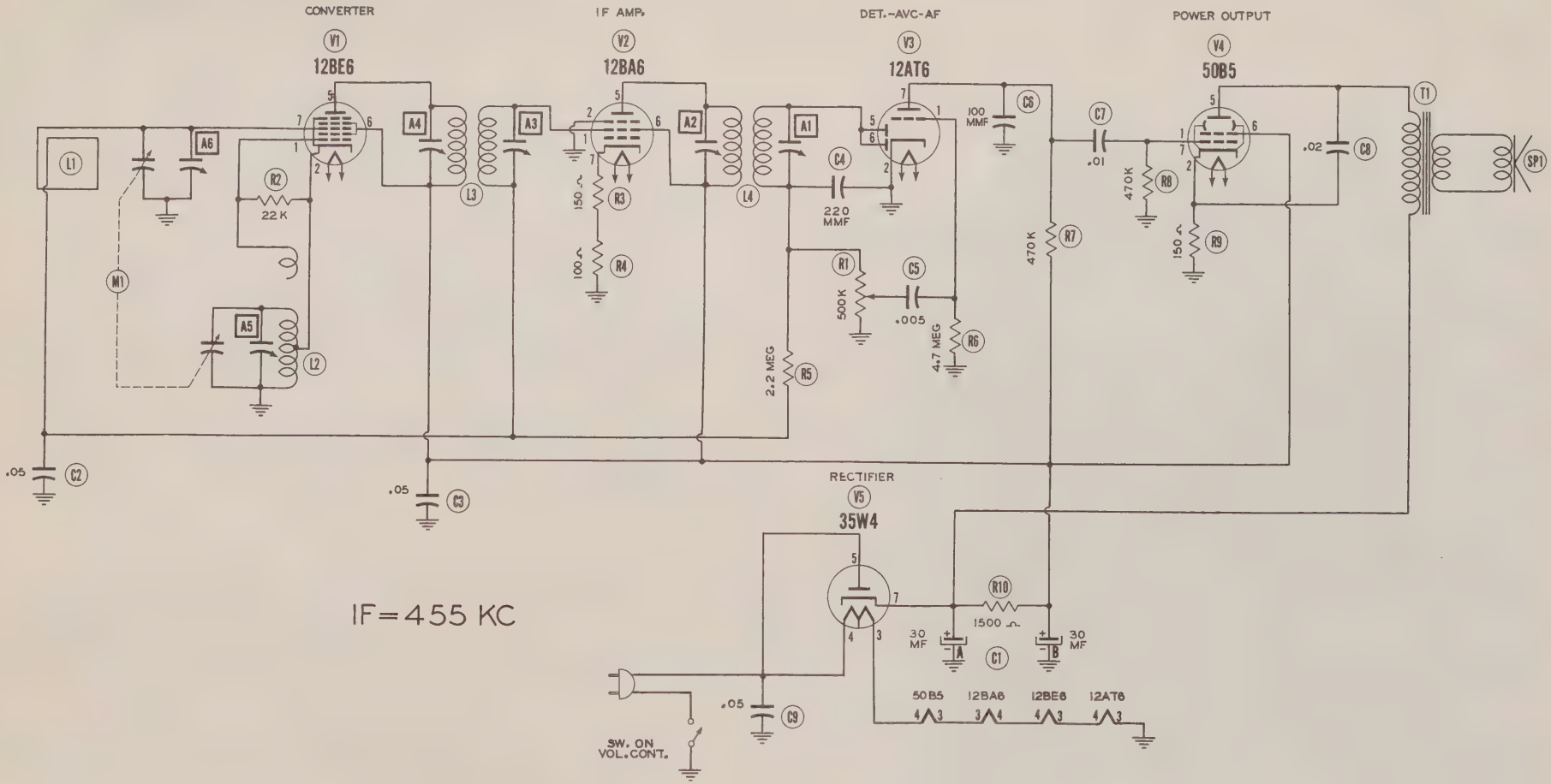
ITEM No.	PART NAME	DEWALD PART No.	NOTES
M1	2 Gang Var. Cap.	2017B	(25-465MMF, 25-193MMF) W/T



CHASSIS—BOTTOM VIEW



DEWALD MODEL 518



IF = 455 KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	§-16VDC	0V.	12VAC	24VAC	105VDC	105VDC	-.1VDC
V 2	12BA6	-.1VDC	0V.	37VAC	24VAC	105VDC	105VDC	2VDC
V 3	12AT6	-.5VDC	0V.	0V.	12VAC	-.5VDC	-.5VDC	42VDC
V 4	50B5	0V.	7.2VDC	37VAC	87VAC	130VDC	105VDC	0V.
V 5	35W4	0V.	0V.	87VAC	117VAC	117VAC	110VAC	135VDC

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.9Ω	13Ω	26Ω	†1.5KΩ	†1.5KΩ	2.7 Meg.
V 2	12BA6	2.7 Meg.	0Ω	39Ω	26Ω	†1.5KΩ	†1.5KΩ	250Ω
V 3	12AT6	4.7 Meg.	0Ω	0Ω	13Ω	500KΩ	500KΩ	†470KΩ
V 4	50B5	470KΩ	150Ω	39Ω	90Ω	†180Ω	†1.5KΩ	470KΩ
V 5	35W4	Inf.	Inf.	90Ω	120Ω	120Ω	115Ω	160KΩ

† MEASURED FROM PIN 7 OF V5.

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

DEWALD MODELS DT-120, DT-122, DT-161, DT-162, L, DT-163, DT-1020, A, DT-1030, A, DT-X-160

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MODEL DT-X-160

DEWALD MODELS DT-120, DT-122, DT-161, DT-162, L, DT-163, DT-1020, A, DT-1030, A, DT-X-160

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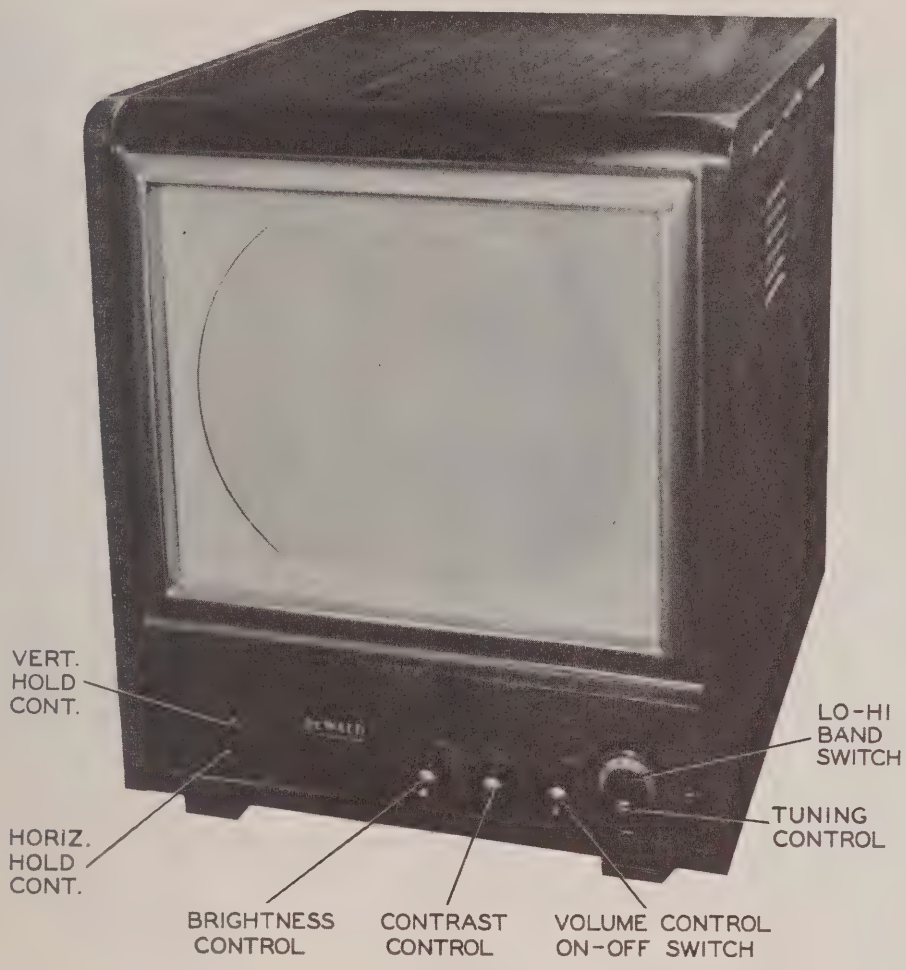
Date 7/50 Set No. 100—Folder No. 6

PHOTOFACT* Folder

*TRADE MARK

DEWALD MODELS DT-120, DT-122, DT-161, DT-162, DT-162L, DT-163, DT-1020,A, DT-1030,A, DT-X-160



DEWALD MODEL DT-X-160

TRADE NAME	Dewald, Models DT-120, DT-122, DT-161, DT-162, DT-162L, DT-163, DT-1020, A, DT-1030, A, DT-X-160
MANUFACTURER	Dewald Radio Corp., 35-15 37th St., Long Island City (1), New York
TYPE SET	Television Receiver
TUBES	Twenty Three
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	2.1 Amp. at 117 Volts AC
TUNING RANGE	Channels 2 thru 13

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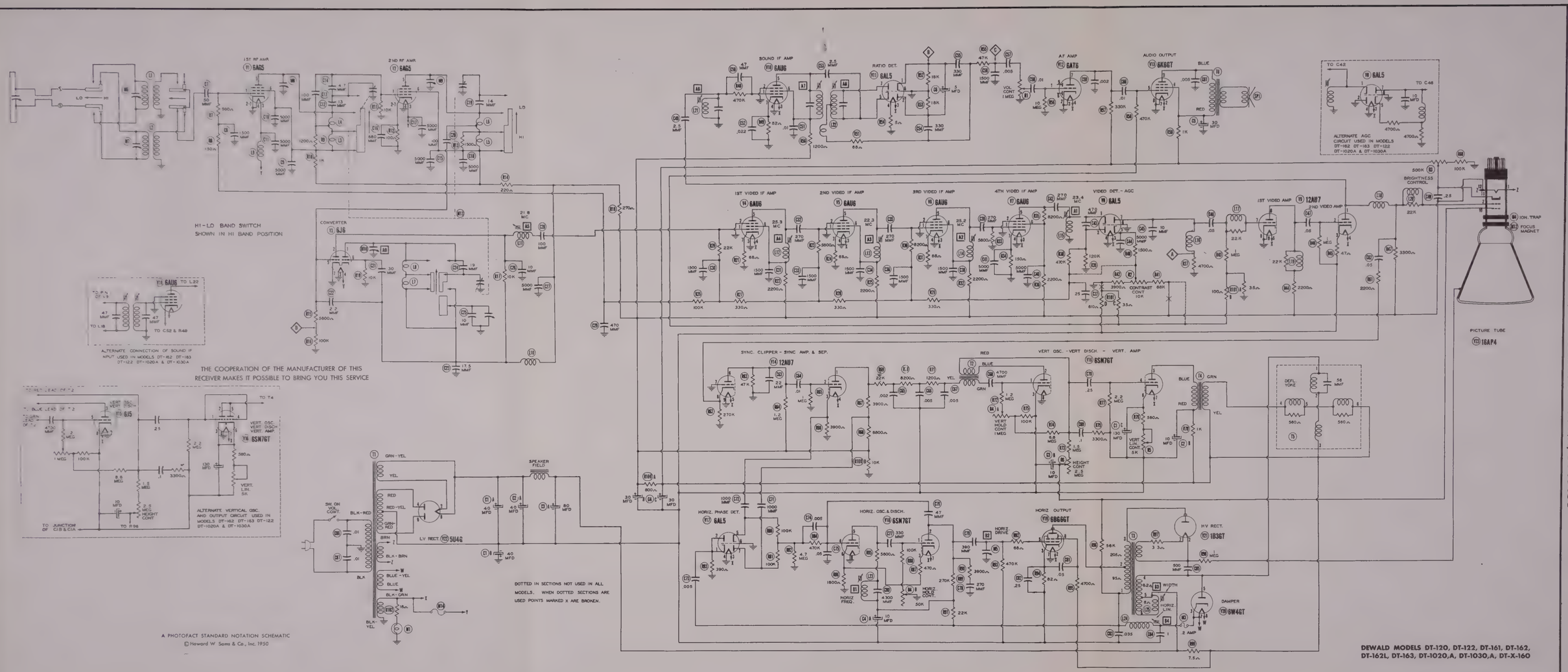
DATE 7-50 SET 100 FOLDER 6

DEWALD MODELS DT-120, DT-122, DT-161, DT-162, DT-162L, DT-163, DT-1020,A, DT-1030,A, DT-X-160



DEWALD MODELS DT-120, DT-122, DT-161, DT-162, DT-162L, DT-163, DT-1020,A, DT-1030,A, DT-X-160

DEWALD MODELS DT-120, DT-122, DT-161, DT-162, DT-162L, DT-163, DT-1020,A, DT-1030,A, DT-X-160

CHASSIS TOP VIEW

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To eliminate the high voltage shock hazard, securely tape the connector on the end of the high voltage lead, and dress it away from the adjustment screws. Do not remove the horizontal oscillator tube.

VIDEO IF ALIGNMENT

Remove the converter tube and replace it with a 6J6 which has pin 1 removed,
Adjust the contrast control to read -3 volts on a VTVM connected between the junction of R39 and C27 and chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over dummy mixer tube (V2). Low side to chassis.	23.4MC (Unmod.)	Any	DC Probe to Point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	Direct	"	25.2MC	"	"	A2	"
3.	Direct	"	22.3MC	"	"	A3	"
4.	Direct	"	25.3MC	"	"	A4	"
5.	Direct	"	21.8MC	"	"	A5	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to ungrounded tube shield floating over dummy converter tube (V2). Low side to chassis.	24MC (10MC SWP)	21.25MC 22.25MC 25.75MC	Any	Vert. Amp. to Point (A). Low side to chassis.		Check for response curve similar to figure 1. If necessary retouch A1 thru A5 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to pin 2 (Grid) of 12AU7 (V9). Low side to chassis.	4.5MC (Unmod.)	Any	DC Probe to Point (B). Common to chassis.	A6, A7	Adjust for maximum deflection.
8.	.01MFD	"	"	"	DC Probe to Point (C). Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to pin 2 (Grid) of 12AU7 (V9). Low side to chassis.	4.5MC (450KC Sweep)	4.5MC	Any	Vert. Amp. to Point (B). Low side to chassis.	A6, A7	Disconnect stabilizer capacitor C6. Adjust for maximum amplitude and symmetry as per figure 2.
8.	.01MFD	"	"	"	"	Vert. Amp. to Point (C). Low side to chassis.	A8	Reconnect capacitor C6. Adjust A8 so 4.5MC occurs at center of crossover lines as per figure 3. Slightly retouch A7 for maximum amplitude and straightness of crossover lines.

HIGH BAND OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Turn the tuner switch to "HIGH BAND" (counter-clockwise).
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	21.9MC 217.25MC	Turn tuning gang fully open	Vert. Amp. to Point (D). Low side to chassis.	A9	Adjust so 21.9MC marker and 217.25MC marker coincide at 100% response as shown in figure 4.
10.	"	"	177MC (10MC SWP)	21.9MC 172.75MC	Turn tuning gang fully closed.	"	L8	Expand or compress coil turns so 21.9MC and 172.75MC marker coincide at 100% response as shown in figure 5. Repeat steps 8 and 9 until no further improvement can be made.

LOW BAND OSCILLATOR ALIGNMENT

Turn the tuner switch to "LOW BAND" (clockwise).

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	85MC (10MC SWP)	21. 9MC 89.25MC	Turn tuning gang fully open	Vert. Amp. to Point (D). Low side to chassis.	L7	Expand or compress coil turns until 21.9MC marker and 89.25MC marker coincide at 100% response as per figure 6.
12.	"	"	57MC (10MC SWP)	21.9MC 58.75MC	Turn tuning gang fully closed	"		Check the coincidence of the 21.9MC marker and the 58.75MC marker. If they are not within 1/2MC of each other, it will be necessary to compromise between the high band and low band oscillator adjustments. The markers should not be more than 1/2MC apart on any channel.

THE RF PORTION OF THIS TUNER HAS BEEN PRE-SET AT THE FACTORY AND ARE VERY STABLE. ADJUSTMENT OF THIS PORTION WILL NOT NORMALLY BE REQUIRED IN THE FIELD.

ALIGNMENT INSTRUCTIONS (CONT.)

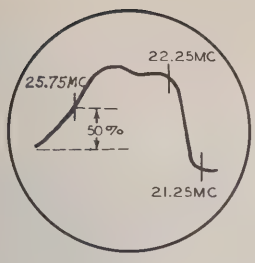


FIG.1

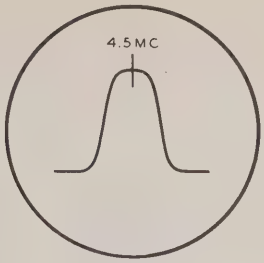


FIG. 2

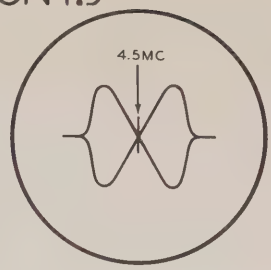
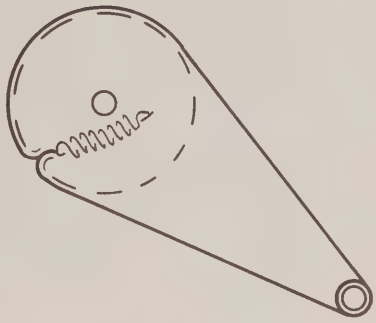


FIG. 3

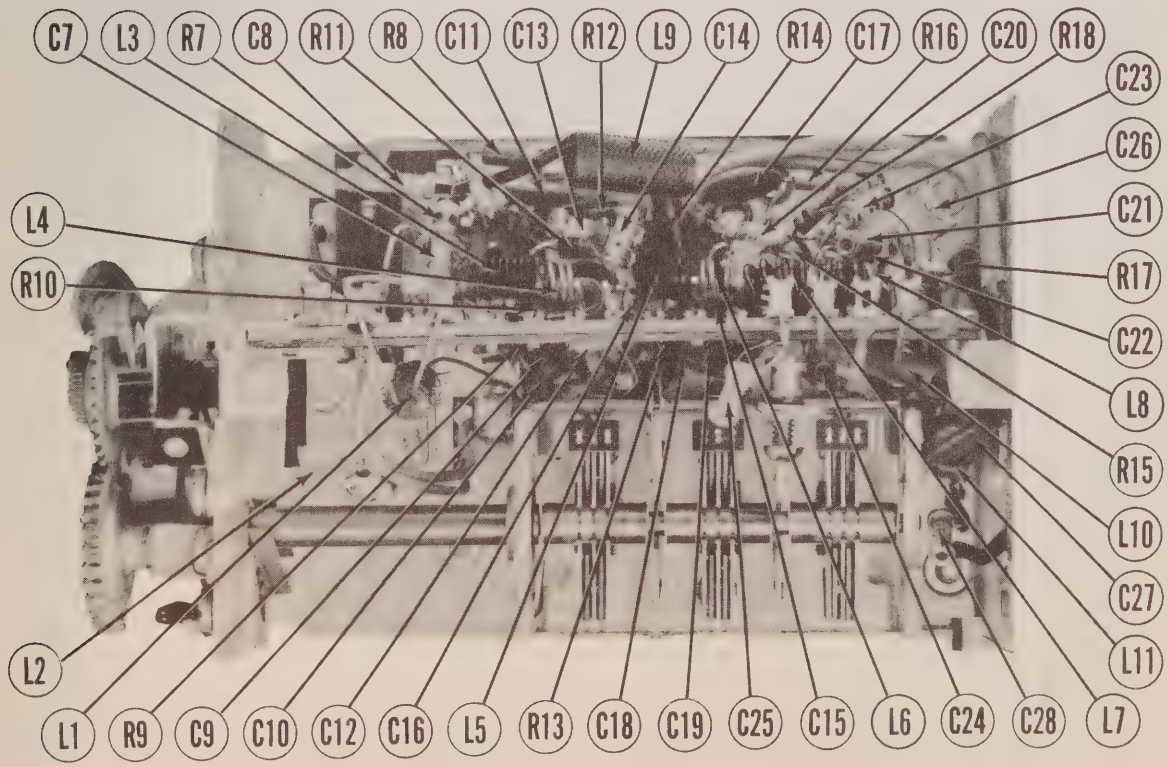
FIG.4

FIG.5

FIG.6



FINE TUNING DRIVE CORD STRINGING



RF TUNER

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-2.7VDC	0V.	6.3VAC	0V.	130VDC	13VDC	0V.		
V 2	6AG5	0V.	1.2VDC	6.3VAC	0V.	155VDC	155VDC	1.2VDC		
V 3	6J6	160VDC	105VDC	0V.	6.3VAC	-2.8VDC	§-9.4VDC	0V.		
V 4	6AU6	-3VDC	0V.	0V.	6.3VAC	170VDC	170VDC	0V.		
V 5	6AU6	-3VDC	0V.	6.3VAC	0V.	170VDC	170VDC	0V.		
V 6	6AU6	-3VDC	0V.	6.3VAC	0V.	170VDC	170VDC	0V.		
V 7	6AU6	0V.	0V.	6.3VAC	0V.	90VDC	150VDC	1.2VDC		
V 8	6AL5	0V.	-9.7VDC	6.3VAC	0V.	-9.6VDC	0V.	-.2VDC		
V 9	12AU7	100VDC	-87VDC	-87VDC	6.3VAC	6.3VAC	155VDC	-.7VDC	0V.	0V.
V 10	6AU6	0V.	0V.	6.3VAC	0V.	155VDC	155VDC	1VDC		
V 11	6AL5	.1VDC	.1VDC	6.3VAC	1.2VAC	-.1VDC	0V.	.1VDC		
V 12	6AT6	-.4VDC	0V.	0V.	6.3VAC	0V.	0V.	70VDC		
V 13	6K6GT	6.3VAC	6.3VAC	215VDC	230VDC	-4.8VDC	-15VDC	0V.	0V.	
V 14	12AU7	150VDC	0V.	7.2VDC	6.3VAC	6.3VAC	5.5VDC	0V.	.9VDC	0V.
V 15	6J5	NOT USED IN ALL MODELS								
V 16	6SN7GT	-95VDC	36VDC -2.3VDC	-90VDC	-60VDC	250VDC	-75VDC -70VDC	6.3VAC	0V.	
V 17	6AL5	0V.	0V.	6.3VAC	0V.	3.4VDC	0V.	-3VDC		
V 18	6SN7GT	-1.6VDC	70VDC	8VDC	.1VDC	195VDC	7.8VDC	6.3VAC	0V.	
V 19	6BG6G	0V.	6.3VAC	-75VDC	0V.	-75VDC	-1VDC	0V.	160VDC	TOP CAP *
V 20	6W4GT	0V.	0V.	320VDC	320VDC	250VDC	0V.	¶	¶	
V 21	1B3GT	* DO NOT MEASURE.								
V 22	5U4G	0V.	265VDC	0V.	355VAC	0V.	355VAC	0V.	265VDC	
V 23	16AP4	¶	100VDC	PIN 10 310VDC	PIN 11 250VDC	PIN 12 ¶				

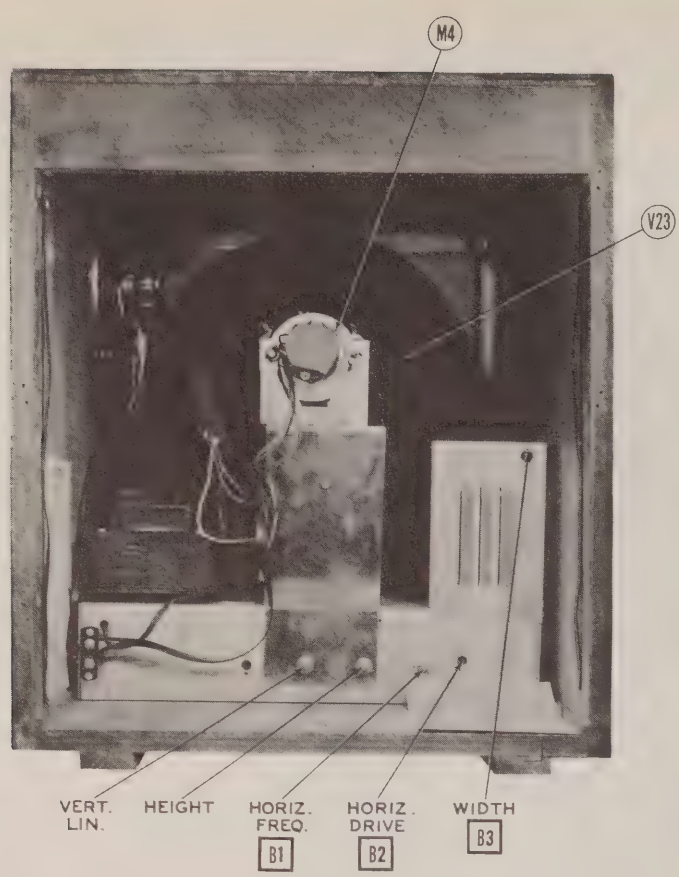
§ TAKEN WITH VACUUM TUBE VOLTMETER.
* DO NOT MEASURE.
¶ 6.3VAC MEASURED ACROSS FILAMENTS.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	700KΩ	0Ω	.1Ω	0Ω	†3KΩ	†3KΩ	0Ω		
V 2	6AG5	10KΩ	100Ω	.1Ω	0Ω	†1.5KΩ	†1.5KΩ	100Ω		
V 3	6J6	†1.2KΩ	†11.2KΩ	0Ω	.1Ω	105KΩ	10KΩ	0Ω		
V 4	6AU6	610KΩ	0Ω	0Ω	.1Ω	†3KΩ	†3KΩ	68Ω		
V 5	6AU6	595KΩ	0Ω	.1Ω	0Ω	†3KΩ	†3KΩ	68Ω		
V 6	6AU6	600KΩ	0Ω	.1Ω	0Ω	†3KΩ	†3KΩ	68Ω		
V 7	6AU6	5.6KΩ	0Ω	.1Ω	0Ω	†11.2KΩ	†3KΩ	150Ω		
V 8	6AL5	.2Ω	120KΩ	.1Ω	0Ω	6KΩ	0Ω	4.7KΩ		
V 9	12AU7	†4.1KΩ	1 Meg.	825Ω	.1Ω	.1Ω	†3KΩ.	1 Meg.	0Ω	0Ω
V 10	6AU6	470KΩ	0Ω	.1Ω	0Ω	†2KΩ	†2KΩ	82Ω		
V 11	6AL5	20KΩ	20KΩ	.1Ω	2.2Ω	Inf.	0Ω	Inf.		
V 12	6AT6	10 Meg.	0Ω	0Ω	.1Ω	Inf.	Inf.	†330KΩ		
V 13	6K6GT	.1Ω	.1Ω	†1.5KΩ	†1000Ω	470KΩ	135Ω	0Ω	0Ω	
V 14	12AU7	†11.5KΩ	1 Meg.	3.9KΩ	.1Ω	.1Ω	†57KΩ	0Ω	270KΩ	0Ω
V 15	6J5	NOT USED IN ALL MODELS.								
V 16	6SN7GT	2.4 Meg.	#1.5 Meg. #3 Meg.	770Ω	2.2 Meg.	†1.8KΩ	1.4KΩ 6.4KΩ	.1Ω	0Ω	
V 17	6AL5	390Ω	390Ω	.1Ω	0Ω	4.8 Meg.	0Ω	4.8 Meg.		
V 18	6SN7GT	150KΩ	#290KΩ	2.2KΩ	5 Meg.	#28KΩ	1.8KΩ	.1Ω	0Ω	
V 19	6BG6G	Inf.	.1Ω	960Ω	Inf.	470KΩ	44KΩ	0Ω	†5KΩ	TOP CAP #140Ω
V 20	6W4GT	Inf.	Inf.	#0Ω	#5Ω	†75Ω	Inf.	#0Ω	#.1Ω	
V 21	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP #400Ω
V 22	5U4G	Inf.	7KΩ	Inf.	800Ω	Inf.	800Ω	Inf.	7KΩ	
V 23	16AP4	†895Ω	†4KΩ	PIN 10 #56KΩ	PIN 11 100KΩ	PIN 12 †895Ω				

† MEASURED FROM PIN 8 OF V22.
# MEASURED FROM PIN 3 OF V20.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to the mid position of its range.

Adjust the horizontal frequency slug (B1) to the center of the range over which the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) clockwise as far as possible without crowding the right side of the picture.

Adjust the width slug (B3) until the picture fills the mask horizontally.

Adjust the horizontal linearity slug (B4) until the picture is symmetrical from left to right. Readjustment of B2 may be necessary to obtain optimum results.

DISASSEMBLY INSTRUCTIONS

1. Remove seven push-on type control knobs from front of set.
2. Remove seven phillips head screws holding rear cover. Remove cover.
3. Disconnect built-in antenna lead at chassis terminal.
4. Remove socket and ion trap from picture tube.
5. Remove front panel by removing two wing nuts holding panel on inside of top.
6. Remove picture tube through front opening.
7. Disconnect HV plug at picture tube support socket.
8. Remove speaker plug from speaker. Loosen 1/4" hex head screw holding antenna and speaker lead guide to side of cabinet. Remove leads.
9. Remove 1/4" hex head screw holding rear yoke support to bottom of cabinet.
10. Remove five 3/8" hex head bolts holding chassis at bottom. Remove chassis.
11. Remove two 5/16" hex nuts holding speaker. Remove speaker.

CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION

CHASSIS BOTTOM VIEW–RESISTOR IDENTIFICATION

BLOCK DIAGRAM
V23
AF AMP. V12
AUDIO OUTPUT V13
RATIO DET V11
SOUND IF AMP. V10
VIDEO AMP. V 9
VIDEO DET. 1/2 V 8
1ST VIDEO IF AMP. V 4
2ND VIDEO IF AMP. V 5
3RD VIDEO IF AMP. V 6
4TH VIDEO IF AMP. V 7
VERT. AMP. 1/2 V16
VERT. OSC. 1/2 V16
SYNC. CLIPPER V14
SYNC. AMP. & SEP.
HORIZ. OUTPUT V19
DAMPER V20
HV RECT. V21
HORIZ. PHASE DET. V17
HORIZ. MULT. V18
1ST RF AMP. V 1
2ND RF AMP. V 2
CONV. V 3
AGC
AGC RECT. 1/2 V 8
LV RECT. V22
B-
B+
B++

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	1st RF Amp.	6AG5	6AG5	7BD	
V2	2nd RF Amp.	6AG5	6AG5	7BD	
V3	Converter	6J6	6J6	7BF	
V4	1st Video IF	6AU6	6AU6	7BK	
V5	2nd Video IF	6AU6	6AU6	7BK	
V6	3rd Video IF	6AU6	6AU6	7BK	
V7	4th Video IF	6AU6	6AU6	7BK	
V8	Video DET. -AGC	6AL5	6AL5	6BT	
V9	1st & 2nd Video Amp.	12AU7	12AU7	9A	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Det.	6AL5	6AL5	6BT	
V12	AF Amp.	6AT6	6AT6	7BT	
V13	Audio Output	6K6GT	6K6GT	7S	
V14	Sync. Clipper-Sync. Amp. & Sep.	12AU7	12AU7	9A	
V15	Vert. Osc.-Vert. Disch.	6J5	6J5	6Q	Used in models DT-162, DT-163, DT-122, DT-1020A, DT-1030A only.
V16A	Vert. Osc.-Vert.	6SN7GT	6SN7GT	8BD	Used in models DT-1020, DT-1030 only.
B	Vert. Amp.	6SN7GT	6SN7GT	8BD	Used in models DT-162, DT-163, DT-122, DT-1020A, DT-1030A only.
V17	Hor. Phase Det.	6AL5	6AL5	6BT	
V18	Hor. Osc. & Disch.	6SN7GT	6SN7GT	8BD	
V19	Hor. Output	6BG6GT	6BG6GT	5BT	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rect.	1B3GT	1B3GT	3C	
V22	LV Rect.	5U4G	5U4G	5T	
V23A	Picture Tube	16AP4	16AP4	12D	Used in models DT-X-160, DT-161, DT-162L
B	Picture Tube	16GP4	16GP4	12D	Used in models DT-162, DT-163 only.
C	Picture Tube	12LP4	12LP4	12D	Used in models DT-120, DT-122 only.
D	Picture Tube	10BP4	10BP4	12D	Used in models DT-1020, DT-1020A, DT-1030, DT-1030A only.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	2042A-3	AFH8J6D26B			TVL-57	▲ Filter
B	40	150						■ Filter
C	130	50						▲ Vert. Output Cath. Bypass
C2A	40	450	2042A-2	AFH82J			TVL-69	▲ Filter
B	10	450						▲ Vert. Output Plate Dec.
C3A	80	450	2042A-5	AFH162J			TVL-47	▲ Filter
B	10	450						▲ Decoupling
C4A	10	450	2042A-4	AFH268J			TVL-30	▲ Decoupling
B	30	450						■ Filter
C	30	450						▲ Filter
C5	30	450	3044A-1	PRS450/30			TVA-23	Output Decoupling
C6	5	50	3044A-2	PRS150/4			TVA-13	Stabilizing Cap.
C7	50			GP50K	D6-500	GP1K-50		RF Coupling
C8	1500			GP1500M	D6-152	GP2L-0015		AGC Filter
C9	5000			BPD-5		811-005	29C1	1st RF Decoupling
C10	5000			BPD-5		811-005	29C1	1st RF Decoupling
C11	5000			BPD-5		811-005	29C1	1st RF Fil. Bypass
C12	13			CN13JNPO		NPOK-13		Fixed Padder
C13	100			GP100M	D6-101	GP1K-100		RF Coupling
C14	4.7			CN4.7DNPO	D2-4.7	NPOK-4.7		RF Coupling *
C15	5000			BPD-5		811-005	29C1	2nd RF Decoupling
C16	680			GP680M	D6-681	GP2K-680		2nd RF Cath. Bypass
C17	5000			BPD-5		811-005	29C1	2nd RF Fil. Bypass
C18	5000			BPD-5		811-005	29C1	2nd RF Decoupling
C19	14			CN14JNPO		NPOK-14		Fixed Padder
C20	100			GP100M	D6-101	GP1K-100		RF Coupling
C21	30			GP30K	D6-330	GP1K-30		Osc. Grid Cap.
C22	2.2				D2-2.2			Osc. Coupling
C23	17.5			CN17.5JNPO	D2-18	NPOK-17.5		Fixed Trimmer
C24	19			CN19JNPO	D2-18	NPOK-20		Fixed Padder
C25	10			GP10K	D6-100	GP1K-10		Fixed Trimmer
C26	10			GP10K	D6-100	GP1K-10		Fixed Trimmer
C27	5000			BPD-5	D6-502	811-005	29C1	RF Bypass
C28	100			GP100M	D6-101	GP1K-100		IF Coupling
C29	470			GP470M	D6-471	GP2K-470	1FM-35	AGC Filter *
C30	1500			GP1500M	D6-152	GP2L-001	1FM-215	AGC Filter
C31	1500			GP1500M	D6-152	GP2L-001	1FM-215	1st V. IF Decoupling
C32	270	500		1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C33	1500			GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C34	1500			GP1500M	D6-152	GP2L-0015	1FM-215	2nd V. IF Decoupling
C35	270	500		1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C36	1500			GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C37	.25	200		P488-25			TC-2	AGC Filter
C38	1500			GP1500M	D6-152	GP2L-0015	1FM-215	3rd V. IF Decoupling
C39	270	500		1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C40	5000			BPD-5	D6-502	811-005	29C1	4th V. IF Decoupling
C41	5000			BPD-5	D6-502	811-005	29C1	4th V. IF Cath. Bypass
C42	270	500		1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C43	470			GP470M	D6-471	GP2K-470	1FM-35	IF Coupling *
C44	5000			BPD-5	D6-502	811-005	29C1	DAGC Decoupling *
C45	10			GP10M	D6-100	GP1K-10	MS-41	V. Diode Filter
C46	.05	600		P588-05			TM-15	Video Coupling
C47	.05	600		P588-05			TM-15	Video Coupling
C48	.25	400		P488-25			TC-2	Pic. Tube Cath. Bypass
C49	2.5			CN2.5CNPO	D2-2.2			S. IF Coupling
C50	47			GP47M	D6-470	GP1K-47	1FM-45	S. IF Coupling
C51	.01	600		P588-01	D6-103	811-01	TM-11	S. IF Decoupling
C52	.022	400		P488-022			TM-12	S. IF Cath. Bypass
C53	2.5			CN2.5CNPO	D2-2.2			Neutralizing *
C54	330			GP330M	D6-331	GP2K-330	1FM-335	Diode Load Cap.
C55	330			GP330M	D6-331	GP2K-330	1FM-335	Diode Load Cap.
C56	1500			GP1500M	D6-152	GP2L-0015	1FM-215	De-emphasis

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C57	.005	600		P688-005	D6-502	811-005	TM-25	Audio Coupling †
C58	.01	600		P688-01	D6-103	811-01	TM-11	Audio Coupling
C59	.002	600		P688-002	D6-202	GP2M-200	TM-22	De-emphasis
C60	.01	600		P688-01	D6-103	811-01	TM-11	Audio Coupling
C61	.005	600		P688-005	D6-502	811-005	TM-25	Output Plate Bypass
C62	.05	600		P688-05			TM-15	Sync. Coupling
C63	22			GP22M	D6-220	GP1K-22	MS-425	Sync. Clipper Plate Byp.
C64	.01	600		P688-01	D6-103	811-01	TM-11	Sync. Coupling
C65	.002	600		P688-002	D6-202	GP2M-002	TM-22	Integrator Net.
C66	.005	600		P688-005	D6-502	811-005	TM-25	Integrator Net.
C67	.005	600		P688-005	D6-502	811-005	TM-25	Integrator Net.
C68	4700	500		1467-005	D6-472	GP2M-0047	1FM-25	Vert. Osc. Grid Cap.
C69	.1	400		P488-1			TM-1	Vert. Discharge
C70	.25	400		P488-25			TC-2	Vert. Sweep Coupling
C71	1000	500		1467-001	D6-102	GP2L-001	1FM-21	Hor. Sync. Coupling
C72	1000	500		1467-001	D6-102	GP2L-001	1FM-21	Hor. Sync. Coupling
C73	.005	600		P688-005	D6-502	811-005	TM-25	Hor. Feedback
C74	.005	600		P688-005	D6-502	811-005	TM-25	AFC Filter
C75	.05	600		P688-05			TM-15	AFC Filter
C76	47			GP47M	D6-470	GP1K-47	1FM-45	Hor. MV Feedback
C77	330	500		1468-00035	D6-331	GP2K-330	1FM-335	Hor. MV Feedback
C78	270	500		1468-00025	D6-271	GP2K-270	MS-325	Hor. Discharge
C79	390	500		1468-0004	D6-391	GP2K-390	1FM-34	Hor. Sweep Coupling
C80	4300	500						Fixed Trimmer
C81	.05	600		P688-05			TM-15	Hor. Output Screen Bypass
C82	.25	200		P488-25			TC-2	Hor. Output Cath. Bypass
C83	.035	600		P688-033				Damper Filter
C84	.1	600		P688-1			TM-1	Damper Filter
C85	500	20000			TV3-502			HV Filter
C86	.01	600		P688-01	D6-103	811-01	TM-11	Line Filter
C87	.01	600		P688-01	D6-103	811-01	TM-11	Line Filter

* Not used in all models.
† Some models use .0025MFD in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	3031A-10	Q13-137	AM-63-Z	BSK-70-S	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SW-A	Not Req.	Attach to R1A per instructions
R2	10KΩ	½	3031A-9		3031A-9		Contrast control
R3A	500KΩ	½	3031A-7	Q11-133	AM-58-S	AN-59	Brightness control
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Attach to R3A per instructions
R4A	1 Meg.	½		B11-137 *			Vert. hold control-panel
B	50KΩ	½	3084A	B11-123 *	3034A	SBB-539	Horiz. hold control-rear
C	Shaft End			E-187 *			Attach per instructions in "Concentrikit".
R5A	5000Ω	½	3031A-4	Q11-114	M-19-S	AN-10	Vert. linearity control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R5A per instructions
R6A	2.5 Meg.	½	3031A-5	Q11-239	M-84-S	AN-83	Height control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R6A per instructions

* Additional parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES: ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R7	560Ω	½		BTS-560	1st RF Grid
R8	150Ω 20%	½			AGC Network
R9	1200Ω	½		BTS-1200	1st RF Plate Decoupling
R10	1000Ω 20%	½		BTS-1000	Decoupling
R11	10KΩ	½			2nd RF Grid
R12	100Ω 20%	½			2nd RF Cathode
R13	1500Ω	½		BTS-1500	2nd RF Plate Decoupling
R14	220Ω 20%	½			Decoupling
R15	5600Ω	½		BTS-5600	Conv. Grid
R16	100KΩ 20%	½			Conv. Grid
R17	10KΩ	½			Conv. Plate
R18	10KΩ	½			Osc. Grid
R19	270Ω	½			Decoupling-See Note 4
R20	22KΩ	½			1st Video IF Grid
R21	68Ω	½			1st Video IF Cathode
R22	2200Ω	½		BTS-2200	1st Video IF Decoupling
R23	5600Ω	½			2nd Video IF Grid
R24	68Ω	½			2nd Video IF Cathode
R25	2200Ω	½		BTS-2200	2nd Video IF Decoupling
R26	100KΩ	½		BTS-100K	AGC Network
R27	330Ω	½			AGC Network
R28	330Ω	½			AGC Network
R29	330Ω	½			AGC Network
R30	8200Ω	½			3rd Video IF Grid
R31	68Ω	½			3rd Video IF Cathode
R32	2200Ω	½		BTS-2200	3rd Video IF Decoupling
R33	5600Ω	½			4th Video IF Grid
R34	150Ω 20%	½			4th Video IF Cathode
R35	8200Ω	½			4th Video IF Plate
R36	2200Ω	½		BTS-2200	4th Video IF Decoupling
R37	4700Ω	½		BTS-4700	Video Det. Diode Load
R38	470KΩ	½		BTS-470K	AGC Network-See Note 1
R39	120KΩ	½		BTS-120K	AGC Rect. Diode Load-See Note 1
R40	1500Ω 20%	½		BTS-1500	Delayed AGC Network-See Note 2
R41	68KΩ 20%	½		BTS-68K	Voltage Divider-See Note 3
R42	3900Ω 20%	½		BTS-3900	Voltage Divider-See Note 4
R43	1 Meg.	½		BTS-1 Meg.	1st Video Amp. Grid
R44	2200Ω	½		BTS-2200	1st Video Amp. Plate
R45	47Ω	½			2nd Video Amp. Cathode
R46	1 Meg.	½		BTS-1 Meg.	2nd Video Amp. Grid
R47	3300Ω	1		BTS-3300	2nd Video Amp. Plate
R48	470KΩ	½		BTS-470K	Sound IF Grid
R49	82Ω	½			Sound IF Cathode

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R50	1200Ω	½		BTS-1200	Sound IF Decoupling
R51	68Ω	½			Balancing
R52	18KΩ	½		BTS-18K	Ratio Det. Diode Load
R53	18KΩ	½		BTS-18K	Ratio Det. Diode Load
R54	5Ω	½			Ratio Det. Filament-Wire Wound
R55	47KΩ	½		BTS-47K	De-emphasis
R56	10 Meg.	½		BTS-10 Meg.	AF Amp. Grid
R57	330KΩ	½		BTS-330K	AF Amp. Plate
R58	470KΩ	½		BTS-470K	Output Grid
R59	1000Ω	1		BTA-1000	Output Decoupling
R60	100KΩ	½		BTS-100K	Voltage Divider
R61	2200Ω	½		BTS-2200	Picture Tube Grid
R62	270KΩ	½		BTS-270K	DC Rest. Load
R63	47KΩ	½		BTS-47K	Voltage Divider
R64	1.2 Meg.	½		BTS-1.2 Meg.	Sync. Clipper Plate
R65	1 Meg.	½		BTS-1 Meg.	Sync. Sep. Grid
R66	3900Ω	½		BTS-3900	Sync. Sep. Cathode
R67	3900Ω	½		BTS-3900	Sync. Sep. Plate
R68	6800Ω	½		BTS-6800	Sync. Sep. Plate
R69	22KΩ	½		BTS-22K	Integrator Network
R70	8200Ω	½		BTS-8200	Integrator Network
R71	1200Ω	1		BTS-1200	Integrator Network-See Note 5
R72	1.2 Meg.	½		BTS-1.2 Meg.	Vert. Osc. Grid
R73	1.5 Meg.	½		BTS-1.5 Meg.	Vert. Osc. Plate
R74	6.8 Meg.	½		BTS-6.8 Meg.	Voltage Divider
R75	100KΩ	½		BTS-100K	Voltage Divider
R76	560Ω	½		BTS-560	Vert. Amp. Cathode
R77	2.2 Meg.	½		BTS-2.2 Meg.	Vert. Amp. Grid
R78	1000Ω	1		BTA-1000	Vert. Amp. Decoupling-See Note 6
R79	3300Ω	½		BTS-3300	Vert. Peaking
R80	100KΩ	½		BTS-100K	Horiz. Phase Det. Load
R81	100KΩ	½		BTS-100K	Horiz. Phase Det. Load
R82	4.7 Meg.	½		BTS-4.7 Meg.	Horiz. Phase Det. Load
R83	390Ω	1		BTA-390	Feedback Network
R84	470KΩ	½		BTS-470K	Horiz. AFC Filter Network
R85	5600Ω	½		BTS-5600	Horiz. Osc. Plate
R86	1800Ω	½		BTS-1800	Horiz. Osc. Cathode
R87	470Ω	½		BTS-470	Horiz. Discharge Cathode
R88	100KΩ	½		BTS-100K	Horiz. Discharge Grid
R89	270KΩ	½		BTS-270K	Horiz. Discharge Plate
R90	3900Ω	½		BTS-3900	Horiz. Peaking
R91	22KΩ	½		BTS-22K	Filter
R92	68Ω	½			Parasitic Supp.
R93	470KΩ	½		BTS-470K	Horiz. Output Grid-See Note 7
R94	82Ω	1		BW-1-82	Horiz. Output Cathode-Wire Wound
R95	4700Ω	2		BT-2-4700	Horiz. Output Screen
R96	56KΩ	½		BTS-56K	Decoupling
R97	3.3Ω	½			HV Rect. Filament-Wire Wound-See Note 8
R98	1 Meg.	1			HV Filter
R99	7.5Ω	1			Filter Network-Wire Wound-See Note 9
R100A	800Ω	10	3032A-2		Filter-Wire Wound
B	10KΩ	15		AB-800	Bleeder-Wire Wound
R101A	35Ω	1		DG-10,000	Bias Network-Wire Wound
B	100Ω	2	3033A-1		Bias Network-Wire Wound
C	35Ω	1			Bias Network-Wire Wound
D	610Ω	10			Bias Network-Wire Wound
R102	18Ω	½		BW-½-18	Series Dial Lamp-See Note 1

Note 1. Not used in all models.
Note 2. Some models use 4700Ω resistor in this application.
Note 3. Some models use 22KΩ resistor in this application.
Note 4. Some models use 1000Ω resistor in this application.
Note 5. Some models use 8200Ω resistor in this application.
Note 6. Some models use 250Ω or 270Ω resistor in this application.
Note 7. Some models use 1 Meg. resistor in this application.
Note 8. Some models use 4.7Ω resistor in this application.
Note 9. Some models use 10Ω or 12Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC @ 2.1A	680VCT .250ADC	5VAC @ 3A	6.3VAC @ 1.2A SEC. 4 6.3VAC @ 7A				

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: DEWALD PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	NOTES
T2	155Ω	1400Ω		A-8111	A-3000	TBO-3	Vert. Block Osc. Trans.
T3	300Ω Tap ③ 95Ω	6.8Ω Tap ③ .6Ω SEC. 2 0Ω		A-8128	HVO-3	TFB-3	Hor. Output Trans.
T4	690Ω	10. 5Ω		A-8112	A-3036	TSO-5 ④	Vert. Output Trans.
T5A	14Ω			DY-1	MD-12		Hor. Deflection Coil
B	65Ω			or DY-7 ⑤	or MD-70 ⑤		Vert. Deflection Coil

④ Drill one new mounting hole.
⑤ 70° deflection necessary for models DT-162 & DT-163 using 16GP4 picture tube.

DEWALD MODELS DT-120, DT-122, DT-161, DT-162, DT-162L, DT-163, DT-1020,A, DT-1030,A, DT-X-160

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		DEWALD PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T6	5.8KΩ	3.1Ω	470Ω	.7Ω		A-3878	A-2931	RO-13	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	DEWALD PART No.	JENSEN PART No.	QUAM PART No.	
SP1	67Ω	3.1Ω			6E67S ⑤	⑤ Remount output transformer.
	CONE DIA.	V. C. DIA.				
SP2	5 7/8"	9/16"				

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	DEWALD PART No.	MEISSNER PART No.	
L1	Ant. Coil	0Ω	0Ω			
L2	Ant. Coil	0Ω	0Ω			
L3	RF Coil	0Ω				
L4	RF Coil	0Ω				
L5	RF Coil	0Ω				
L6	RF Coil	0Ω				
L7	Osc. Coil	0Ω				
L8	Osc. Coil	0Ω				
L9	Fil. Choke	0Ω				
L10	RF Choke	0Ω				
L11	1st Video IF	1Ω				
L12	2nd Video IF	.1Ω				
L13	3rd Video IF	.1Ω				
L14	4th Video IF	.1Ω				
L15	5th Video IF	.1Ω				Not used in model DT-160
L16	Peaking	2.9Ω				36 microhenries
L17	Peaking	5.1Ω			19-1921 †	120 microhenries, Wound on 22KΩ resistor
L18	Peaking	2.9Ω				36 microhenries
L19	Peaking	5.1Ω			19-1921 †	120 microhenries, Wound on 22KΩ resistor
L20	Peaking	5.1Ω			19-1921 †	120 microhenries, Wound on 22KΩ resistor
L21	Sound IF	1.5Ω				
L22	Ratio Det. Trans.	5.5Ω	.6Ω			
L23	Horiz. Freq.	100Ω				
L24	Horiz. Lin.	36Ω				
L25	Width	.2Ω				
L26	3rd Video IF Cath. Trap					Model DT-160 only.

† Add 22KΩ resistor in parallel.

DIAL LIGHTS

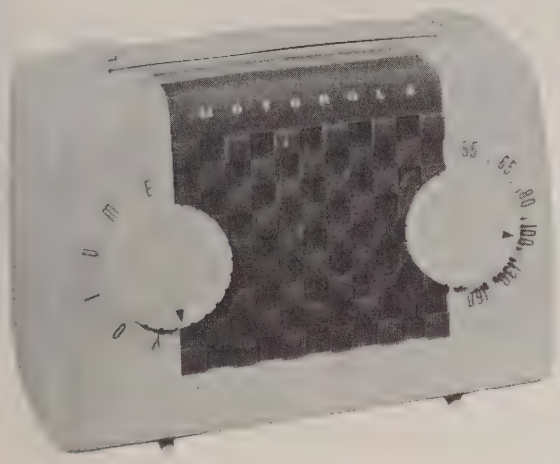
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					DEWALD PART No.		
M1	Bayonet	6-8	.15	Brown			Type #47

MISCELLANEOUS

ITEM No.	PART NAME	DEWALD PART No.	NOTES
M2	RF Tuner		
M3	Fuse		.2A 250V
M4	Ion Trap		
M5	Trimmer		Horiz. drive 40-370MMF
M6	Trimmer		Low band antenna
M7	Trimmer		High band antenna
M8	Trimmer		RF plate
M9	Trimmer		RF plate
M10	Trimmer		Osc. plate
M11	Switch		2 position slide for high and low bands
M12	Focus Magnet Assembly		
M13	Tuning Cap.		3 sections
M14	Fuse		Tuner filaments. Not used in all models.

MOTOROLA MODELS 5J1, 5J1U, 5L1, 5L1U (Ch. HS-224, HS-250)

MOTOROLA MODELS 5J1, 5J1U, 5L1, 5L1U (Ch. HS-224, HS-250)



MODEL 5L1

MODEL 5J1

MOTOROLA MODELS 5J1, 5J1U, 5L1, 5L1U (Ch. HS-224, HS-250)

MOTOROLA MODEL 5L1U

TRADE NAME	Motorola, Models 5J1 (Ch. HS-250), 5J1U (Ch. HS-224), 5L1 (Ch. HS-250), 5L1U (Ch. HS-224)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Illinois
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types 1R5 Converter, 1U4 IF Amp., 1U5 DET-AVC-AF, 3S4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 3 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	.14 Amp. at 117 Volts AC or 170MA at 3 Volts DC and 8MA at 67.5Volts DC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

To set pointer turn tuning cap fully closed and set pointer parallel with base of dial.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (Grid) of 1R5 (V1). Low side to B-.	455KC (400 ∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy antenna to 200MMF to reduce hum modulation.
2.	.1MFD	"	1620KC	"	"	A4	"
3.		Loop	1400KC	Tune for max. output	"	A5	Reinstall set in cabinet. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 1, Indiana

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PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL 5L1U

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amp.	1U4	1U4	6AR	
V3	DET. -AVC-AF	1U5	1U5	6BW	
V4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	150	23B691995	PRSA150/40-40			TA-440	Filter-Red
B	40	150		PRS12/250			UHC-212	Filter-Blue
C	250	10						Filament Bypass-Orange
C2	500		21K481377	GP500M	D6-501	GP2K-500	1FM-35	RF Coupling
C3	10000		21K482726	BPD-10	D6-103	811-01	36C1	Osc. Anode Decoupling
C4	10000		21K482726	BPD-10	D6-103	811-01	36C1	RF Bypass
C5	47		21K77373	GP47M	D6-470	GP1K-47	1FM-45	IF Coupling
C6	.05	100	8K71213	P285-05			68P16	AVC Filter
C7	.05		8K71213	P285-05			68P16	Filament Bypass
C8A	100		21K691992	GP100M	D6-101	GP1K-100		Diode RF Filter
B	2000			GP2000M	D6-202	GP2M-002	34C3	Audio Coupling
C	100			GP100M	D6-101	GP1K-100		AF Amp. Plate Bypass
D	5000			BPD-5	D6-502	811-005		Audio Coupling
C9	10000		21K482726	BPD-10	D6-103	811-01	36C1	AF Amp. Plate Bypass
C10	5000		21A470789	BPD-5	D6-502	811-005	29C1	Output Plate Bypass
C11	.05	400	8K471635	P485-05			68P10	Line Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	18A692018	Q13-137	15/16-63-Z	BSK-70-S	Volume control-See Note
B	Switch		Not Req.	76-2	DPST SW *	Not Req.	Attach to R1A per instructions

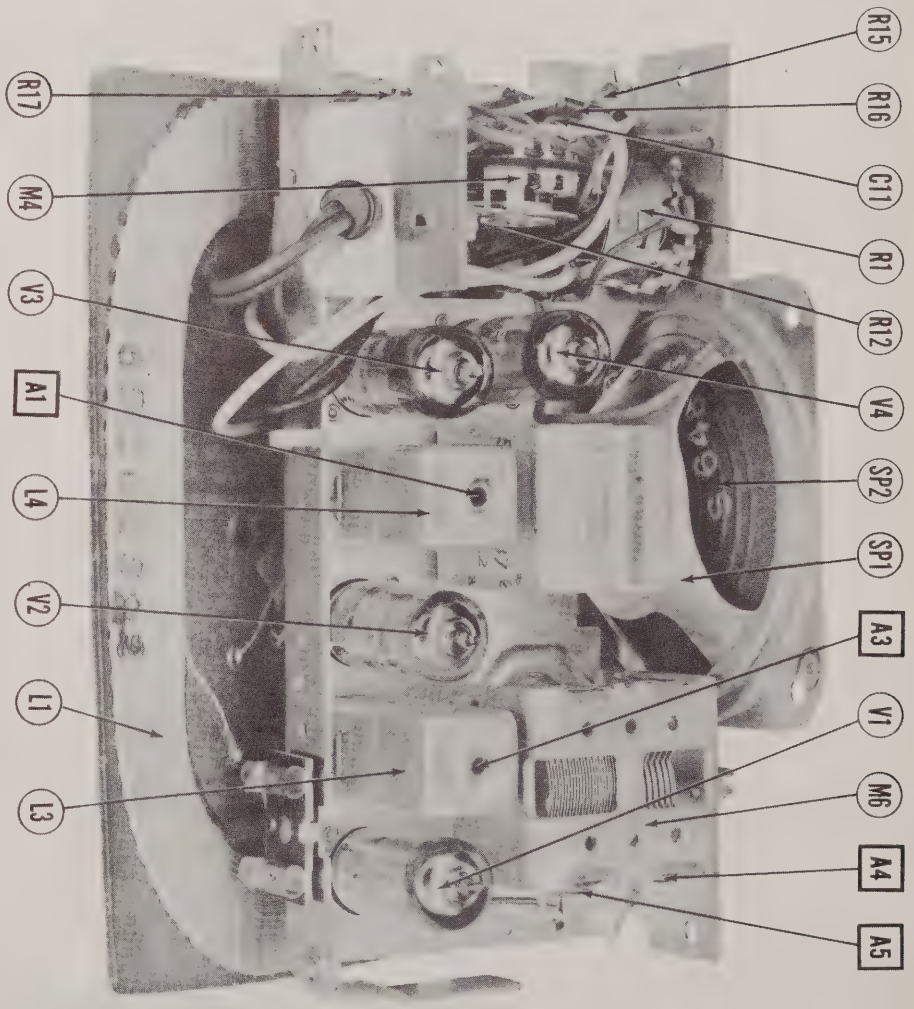
* Switch is attached at factory.

Note. Install a 47KΩ resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	IDENTIFICATION CODES
R2	4.7 Meg.	½	6R2122	BTS-4.7 Meg.	Conv. Grid
R3	100KΩ	½	6R6031	BTS-100K	Osc. Grid
R4	22KΩ	½	6R6397	BTS-22K	Osc. Anode Decoupling
R5	10 Meg.	½	6R2109	BTS-10 Meg.	IF Grid
R6	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	AVC Network
R7	27Ω	½	6R5683	BW-½-27	Filament String
R8	390Ω	½	6R5554	BW-½-390	Filament String
R9	10 Meg.	½	6R2109	BTS-10 Meg.	AF Amp. Grid
R10	4.7 Meg.	½	6R2122	BTS-4.7 Meg.	AF Amp. Screen
R11	1 Meg.	½	6R6004	BTS-1 Meg.	AF Amp. Plate
R12	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Output Grid
R13	270Ω	½	6R6432	BW-½-270	Filament String
R14	680Ω	½	6R6040	BTS-680	Bias Network
R15	220KΩ	½	6R6015	BTS-220K	Bias Network
R16	820Ω	½	6R6269	BTS-820	Bias Network
R17	3300Ω	½	6R5581	BTS-3300	Filter
R18A	150Ω	10	17K692009		Surge Limiter-Wire Wound
B	2000Ω	10	17K692009		Filament Dropping-Wire Wound

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	7300Ω	4Ω	350Ω	.5Ω	25K692006	A-3329 ①	A-2927 ①		① Bend mounting tabs down and mount in original holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	VIKING PART No.	QUAM PART No.	
	FIELD	V. C. IMP.				
SP1	PM	4Ω	50B692037 or 50B692038	35J4	3A07	
	CONE DIA.	V. C. DIA.				
SP2	3 1/4"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
L1A	Loop Ant.	3.2Ω		1X692056		Models 5L1, 5L1U
B	Loop Ant.			1X692139		Complete with cover models 5J1, 5J1U
C	Loop Ant.			1X692141		Panel and hinge assembly less cover models 5J1, 5J1U
L2A	Osc. Coil	2.7Ω	12.4Ω	24B691987	14-1074	Red code chassis HS224 only
B	Osc. Coil			24K600154		White code chassis HS250 only
L3	1st IF	35Ω	35Ω	24B692014	16-6668	
L4	2nd IF	47Ω	47Ω	24B692015	16-6669	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	MOTOROLA PART No.	SYLVANIA PART No.		
M1	.058ADC	48B791092	NB-5		

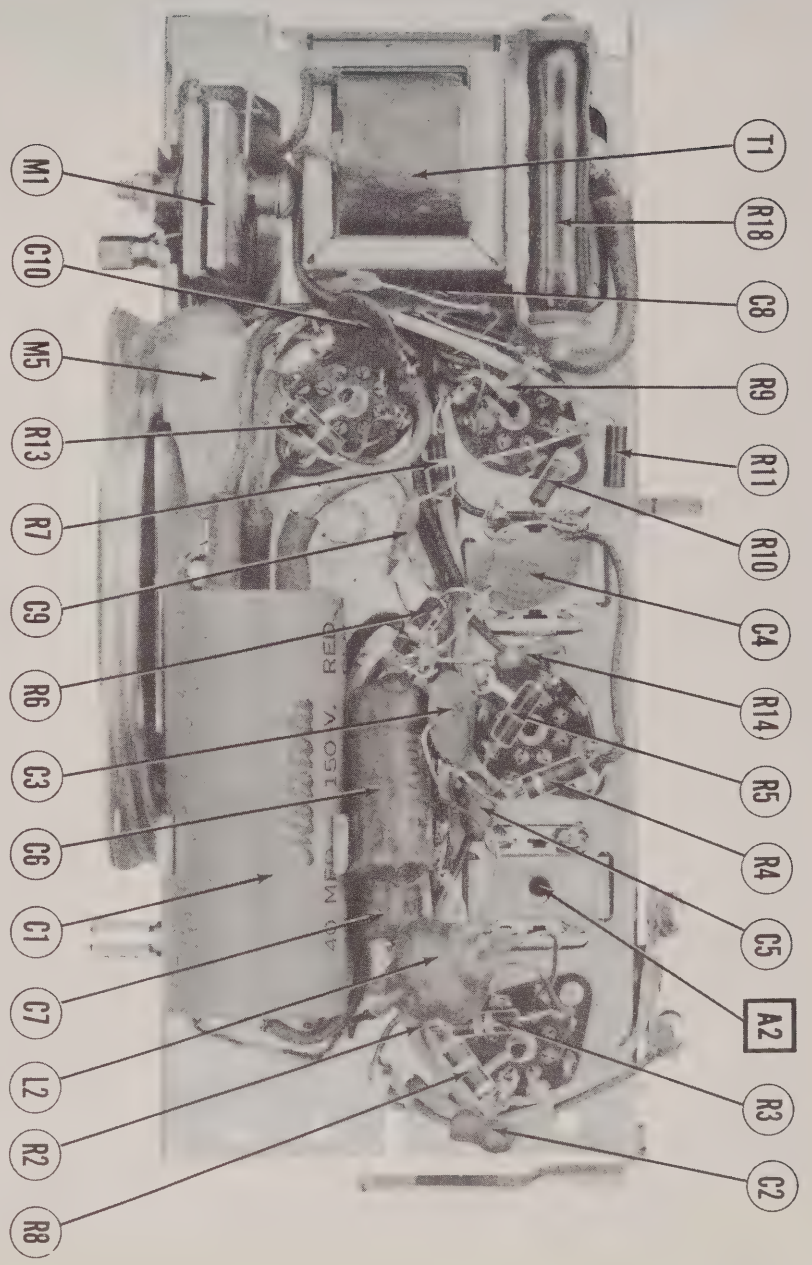
BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	3V "A"		950			2R			2 in series
M3	67.5V "B"			467			XX45		

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4A	Switch	40B471927	AC/DC-Battery (Ch. HS-224)
B	Switch	40K600156	AC/DC-Battery (Ch. HS-250)
M5	Choke Assembly	24K691986	Choke and .05MFD capacitor
M6	2 Gang Var. Cap.	19K692008	(12-402MMF, 14-157MMF)
	Knob	36B691906	Models 5L1, 5L1U
	Knob	36B691923	Models 5J1, 5J1U

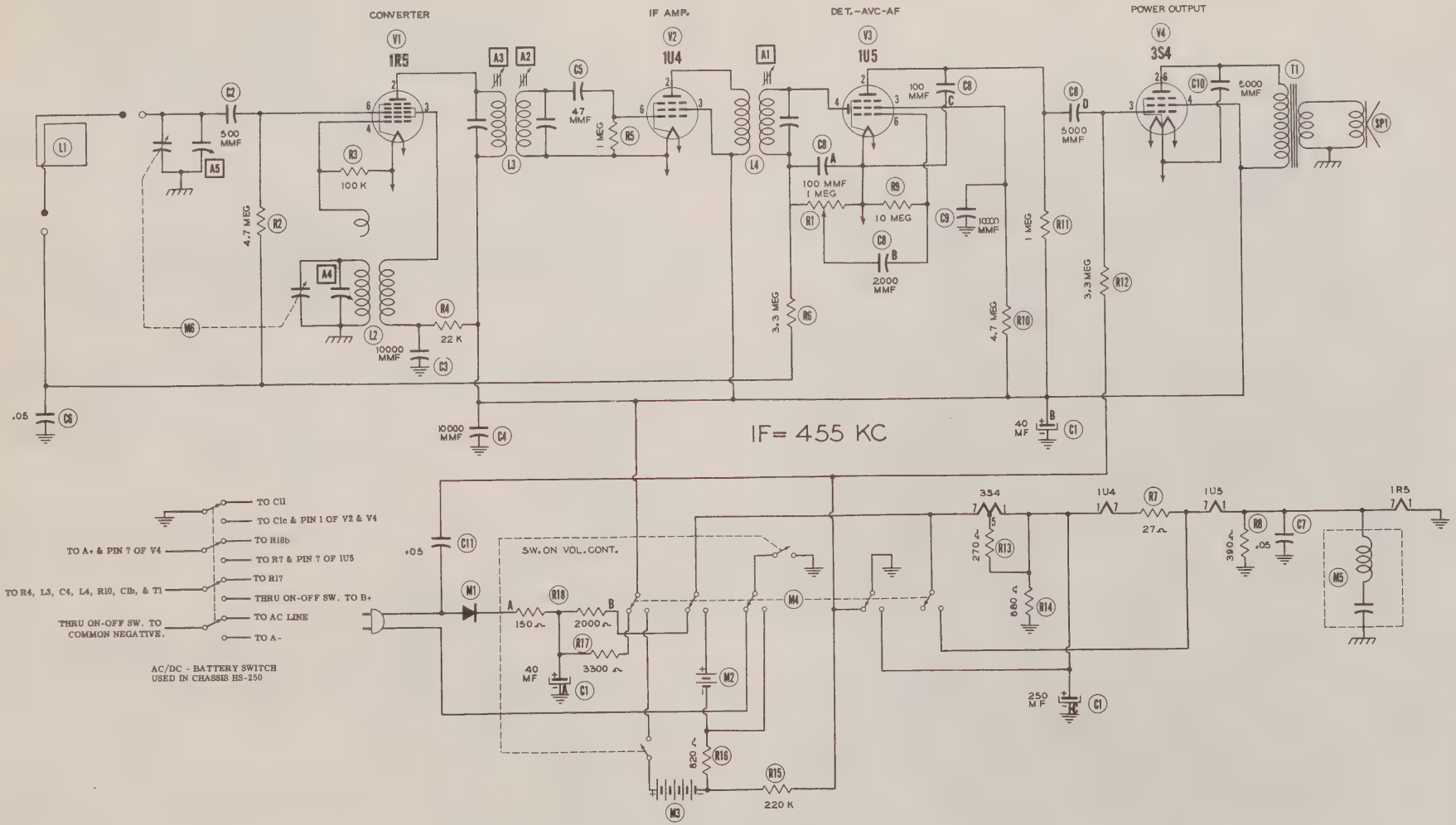
CHASSIS—BOTTOM VIEW



SET 100 FOLDER 7

MOTOROLA MODEL 5L1U

MOTOROLA MODEL 5L1U



V & R TAKEN IN AC/DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	0V.	70VDC	36VDC	§-7.2VDC	0V.	.1VDC	1.2VDC
V 2	1U4	5.5VDC	70VDC	70VDC	0V.	5.5VDC	.1VDC	4VDC
V 3	1U5	1.2VDC	17VDC	12VDC	.2VDC	0V.	.1VDC	2.6VDC
V 4	3S4	5.5VDC	65VDC	0V.	70VDC	6.5VDC	65VDC	8.2VDC

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†3.4KΩ	†25KΩ	100KΩ	*	9 Meg.	*
V 2	1U4	*	†3.4KΩ	†3.4KΩ	Inf.	*	10 Meg.	*
V 3	1U5	*	†1 Meg.	†4.7 Meg.	1 Meg.	Inf.	10 Meg.	*
V 4	3S4	*	†3.7KΩ	3.3 Meg.	†3.4KΩ	*	†3.7KΩ	*

† MEASURED FROM OUTPUT OF M1.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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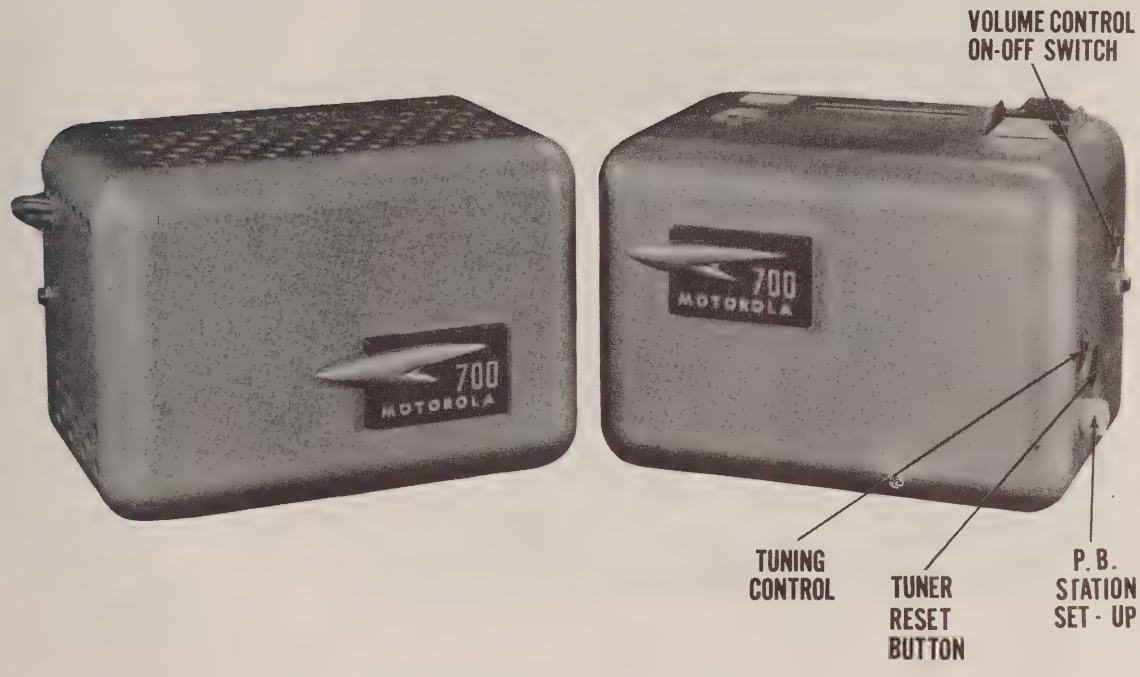
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MOTOROLA
MODEL 700



MOTOROLA
MODEL 700

MOTOROLA MODEL 700

TRADE NAME	Motorola, Model 700
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Illinois
TYPE SET	Battery Operated Universal Automotive Superheterodyne Receiver
TUBES(SIX)	Types 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AT6 DET-AVC-AF, 6AQ5 Power Output, 6X4 Rectifier
POWER SUPPLY	6 Volts Storage Battery — RATING 6 Amp. at 6 Volts DC
TUNING RANGE—BROADCAST	535-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (Grid) of 6BE6 (V2). Low side to chassis.	455KC (400 ∿ Mod.)	Tuning cores fully out	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	See Fig 1.	High side thru dummy to antenna receptacle. Low side to chassis.	1610KC	Tuning cores fully out. (cores should project 1 1/8 ins. out of the cans)	"	A5, A6 A7	"
3.	"	"	1400KC	Tune for max. output	"	A8, A9 A10	"

AFTER SET IS INSTALLED, FULLY EXTEND THE ANTENNA AND TUNE IN A WEAK STATION NEAR 1400KC. ADJUST A7 FOR MAXIMUM OUTPUT.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL 700

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amp.	6BA6	6BA6	7BK	
V4	DET. -AVC-AF	6AT6	6AT6	7BT	
V5	Power Output	6AQ5	6AQ5	7BZ	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	350	23A473015	AFH6H664A			EL-323	■ Filter
B	30	300						▲ Filter
C	20	25						Output Cathode Bypass
C2	100		21B77562	GP100K	D6-101	GP1K-100	1FM-31	Fixed Trimmer
C3	.006	100	8A4529	P488-006	D6-562	811-005	TM-26	RF Coupling
C4	.05	100	8A13514	P288-05			TM-15	AVC Filter
C5	5		21K70720	GP5K	D2-4.7	NPOK-5	MS-55	RF Coupling
C6	47		21K74661	GP47M	D6-470	GP1K-47	1FM-45	Osc. Grid Cap.
C7	500		21K592327	SI500JN150		N150M-500		Fixed Trimmer
C8	.1	400	8R13166	P488-1			TM-1	Decoupling
C9	.006	100	8A4529	P488-006	D6-562	811-005	TM-26	Audio Coupling
C10	1000	500	21R6638	1468-001	D6-102	GP2L-001	1FM-21	AF Amp. Plate Bypass
C11	.006	400	8K71910	P488-006	D6-562	811-005	TM-26	Tone Compensation
C12	.1	100	8R472035	P288-1			TM-1	Bias Filter
C13	.5	100	8K17028	P288-5			68P20	Hash Filter
C14	.03	400	8R71911	P488-03			TM-13	Audio Coupling
C15	.006	400	8K71910	P488-006	D6-562		TM-26	Output Plate Bypass
C16	.006	1600	8K12840	P1688-006			MB-26	Buffer
C17	.5	100	8K17028	P288-5			68P20	Hash Filter
C18	5		21K70720	GP5K	D2-4.7	NPOK-5	MS-55	IF Coupling

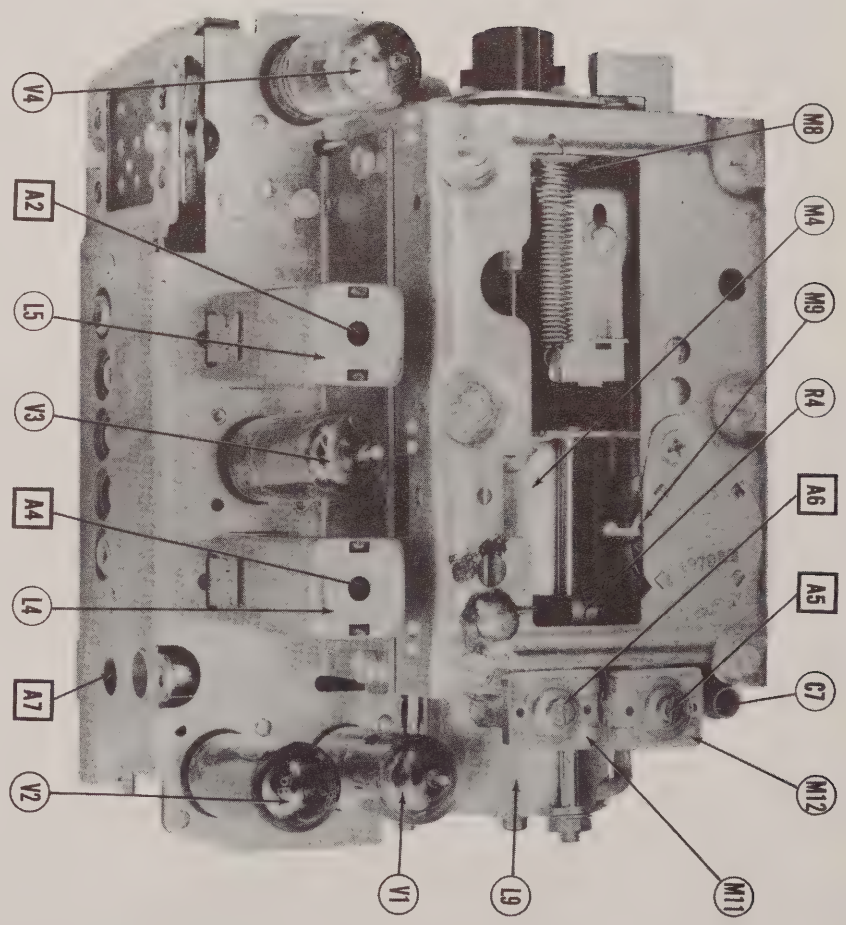
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1	500KΩ	½	1A472531				Volume control and switch

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	IDENTIFICATION CODES
R2	470KΩ	½	6R6032	BTS-470K	AVC Network
R3	470Ω	½	6R6090	BTS-470	RF Cathode
R4	5.6Ω	1	17K484497	BW-1-5.6	Solenoid Shunt-Wire Wound
R5	100KΩ	½	6R6075	BTS-100K	Conv. Grid
R6	47KΩ	½	6R6056	BTS-47K	Osc. Grid
R7	470Ω	½	6R6090	BTS-470	IF Cathode
R8	1 Meg.	½	6R6004	BTS-1 Meg.	AVC Network
R9	6800Ω	½	6R6287	BTA-6800	Decoupling
R10	1 Meg.	½	6R6004	BTS-1 Meg.	Diode Load
R11	47KΩ	½	6R6056	BTS-47K	Diode Filter
R12	2200Ω	½	6R6290	BTS-2200	AF Amp. Cathode
R13	2.2 Meg.	½	6R3927	BTS-2.2 Meg.	Bias Network
R14	10 Meg.	½	6R2109	BTS-10 Meg.	AF Amp. Grid
R15	470KΩ	½	6R6032	BTS-470K	AF Amp. Plate
R16	47KΩ	½	6R6056	BTS-47K	Tone Compensation
R17	220KΩ	½	6R6015	BTS-220K	Output Grid
R18	270Ω	1	6R6336	BW-1-270	Output Cathode
R19	1000Ω	1	6R6184	BW-1-1000	Filter
R20	10KΩ	½	6R6054	BTS-10K	Buffer
R21	470Ω	½	6R3949	BTS-470	Bias Network
R22	56Ω	½	6R5614	BW-½-56	Hash Suppression
R23	56Ω	½	6R5614	BW-½-56	Hash Suppression

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	6VDC @ 3.6A	520VCT .065ADC			25K590650		P-3068	VT-5 ②

② Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	5200Ω	3.5KΩ	470Ω	.4Ω	25B70171	A-3877	A-2930	RO-8	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-108		
SP1	PM	3.5Ω	50B592351	MOD. P6-X	6A15	
	CONE DIA.	V. C. DIA.				
SP2	6"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
L1	Ant. Coil	11Ω		24B71881 *		Specify dot color when ordering
L2	RF Coil	11Ω		24B71881 *		Specify dot color when ordering
L3	Osc. Coil	.9Ω	3Ω	24B592153 *		Specify dot color when ordering
L4	1st IF	19Ω	19Ω	24B485553	16-6758	
L5	2nd IF	17Ω	17Ω	24K485555	16-6758 †	
L6	Hash Choke	0Ω		24K592269		
L7	Hash Choke	0Ω		24K592269		
L8	Hash Choke	.2Ω		24A472535-0		
L9	Solenoid Coil			*		

* Part of solenoid tuner ST-78

† Add 100MMFD from lug 2 to ground
Add 100MMFD from volume control to ground
Connect same resistor to lug 2 and volume control

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA			INSTALLATION NOTES
				MOTOROLA PART No.	AEROVOX PART No.	RADIART PART No.	
M1	Int.	6	115 ∿	48B3333	A-200	5342	

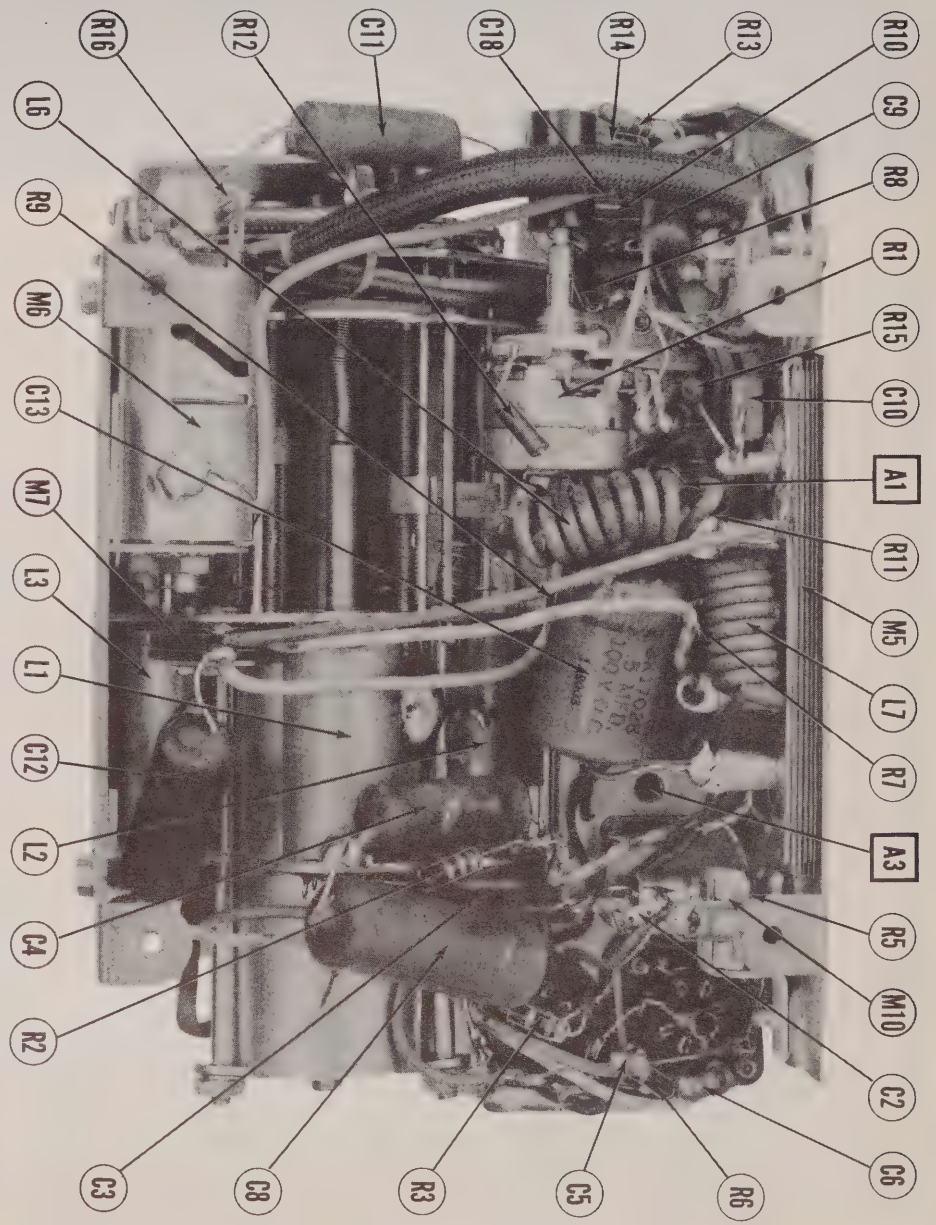
DIAL LIGHTS

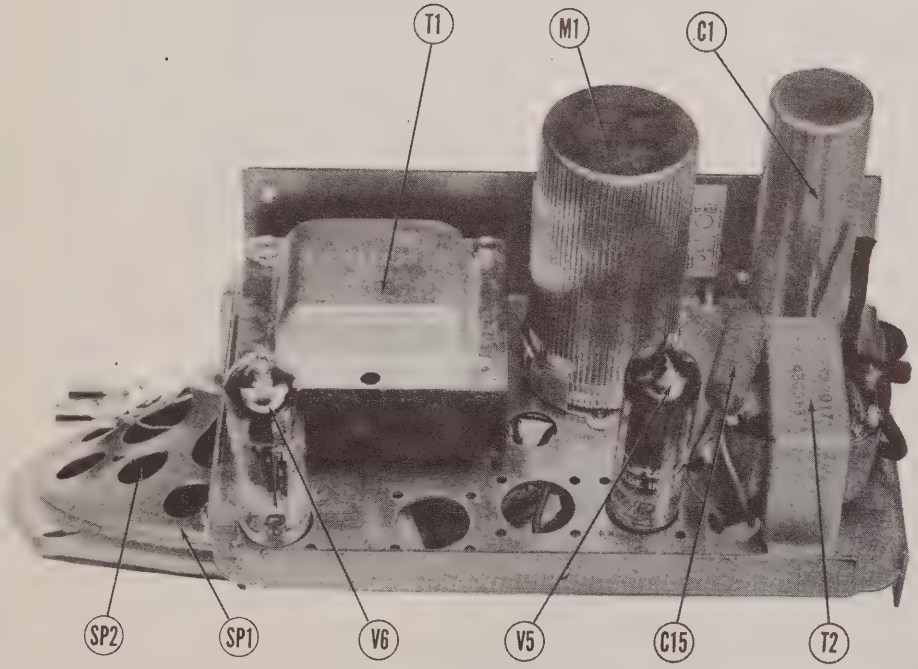
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					MOTOROLA PART No.		
M2	Bayonet	6-8	.2	White	65X4151		Type #51

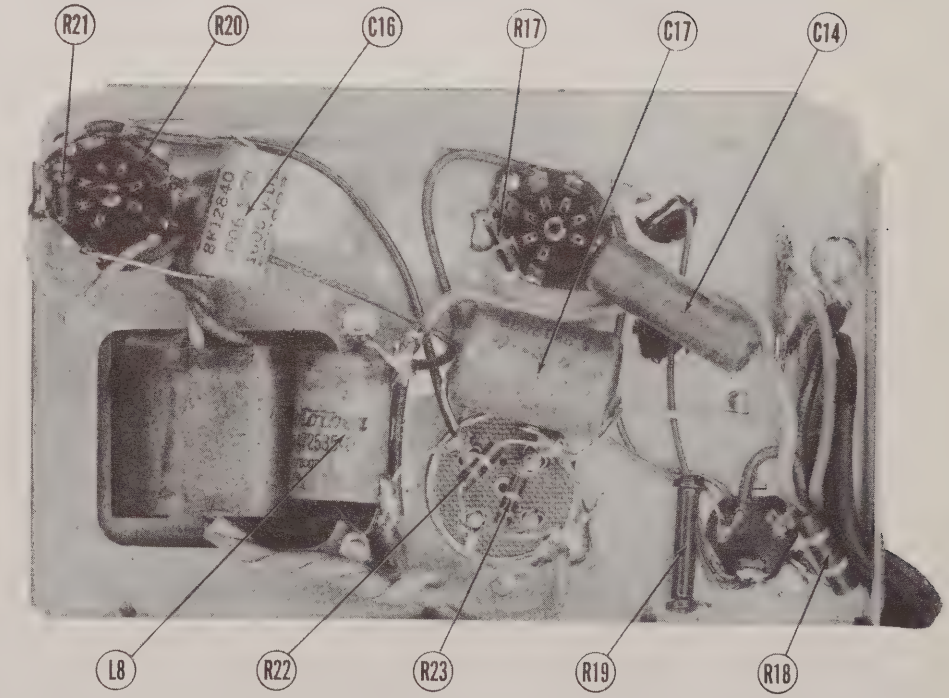
MISCELLANEOUS

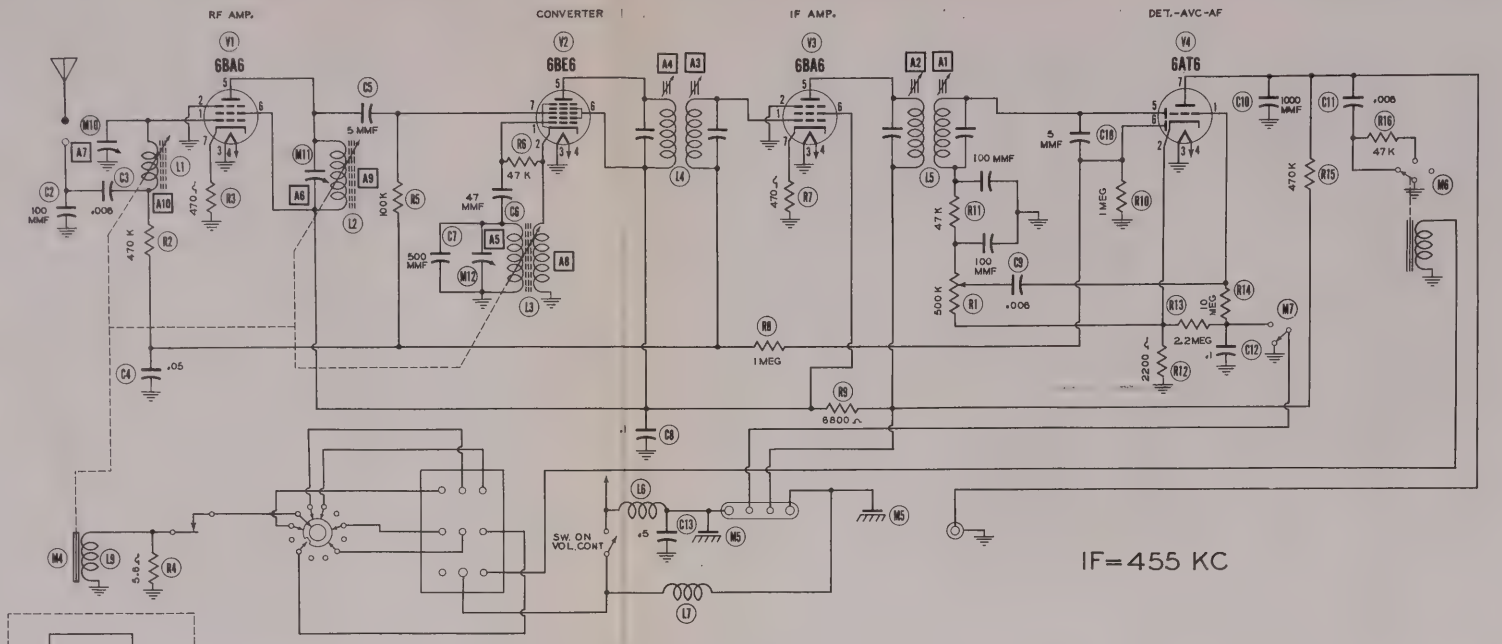
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Fuse	65K4637	SFE 20 Amp.
M4	Tuner	1X592280	Solenoid
M5	Spark Plate	1B592133	
M6	Relay	1X592220	Tone
M7	Switch	40A472644	Mute
M8	Switch	40B70952	Selector
M9	Switch	1B70944	Solenoid
M10	Trimmer	20A592135	Ant. Adj. (A7)
M11	Trimmer	20K481527	RF Adj. (A6)
M12	Trimmer	20K472612	Osc. Adj. (A5)

CHASSIS—BOTTOM VIEW




T1
M1
C1
SP2
SP1
V6
V5
C15
T2


R21
R20
C16
R17
C17
C14
L8
R22
R23
R19
R18



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	-.1VDC	0V.	0V.	6.3VDC	95VDC	95VDC	3VDC
V 2	6BE6	§-3.4VDC	0V.	0V.	6.3VDC	120VDC	120VDC	-.1VDC
V 3	6BA6	-.1VDC	0V.	0V.	6.3VDC	205VDC	115VDC	1.2VDC
V 4	6AT6	-.1VDC	.8VDC	0V.	6.3VDC	.2VDC	-.1VDC	60VDC
V 5	6AQ5	0V.	11VDC	0V.	6.3VDC	210VDC	205VDC	0V.
V 6	6X4	260VAC	0V.	0V.	6.3VDC	260VAC	260VAC	225VDC

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	2.8 Meg.	0Ω	0Ω	.5Ω	†7.8KΩ	†7.8KΩ	470Ω
V 2	6BE6	47KΩ	1Ω	0Ω	.5Ω	†7.8KΩ	†7.8KΩ	2.1 Meg.
V 3	6BA6	2 Meg.	0Ω	0Ω	.5Ω	†1000Ω	†7.8KΩ	470Ω
V 4	6AT6	10 Meg.	2.2KΩ	0Ω	.5Ω	580KΩ	1 Meg.	†470KΩ
V 5	6AQ5	220KΩ	270Ω	0Ω	.8Ω	†470Ω	†1000Ω	220KΩ
V 6	6X4	470Ω	0Ω	0Ω	.5Ω	10KΩ	470Ω	120KΩ

† MEASURED FROM PIN 7 OF V6.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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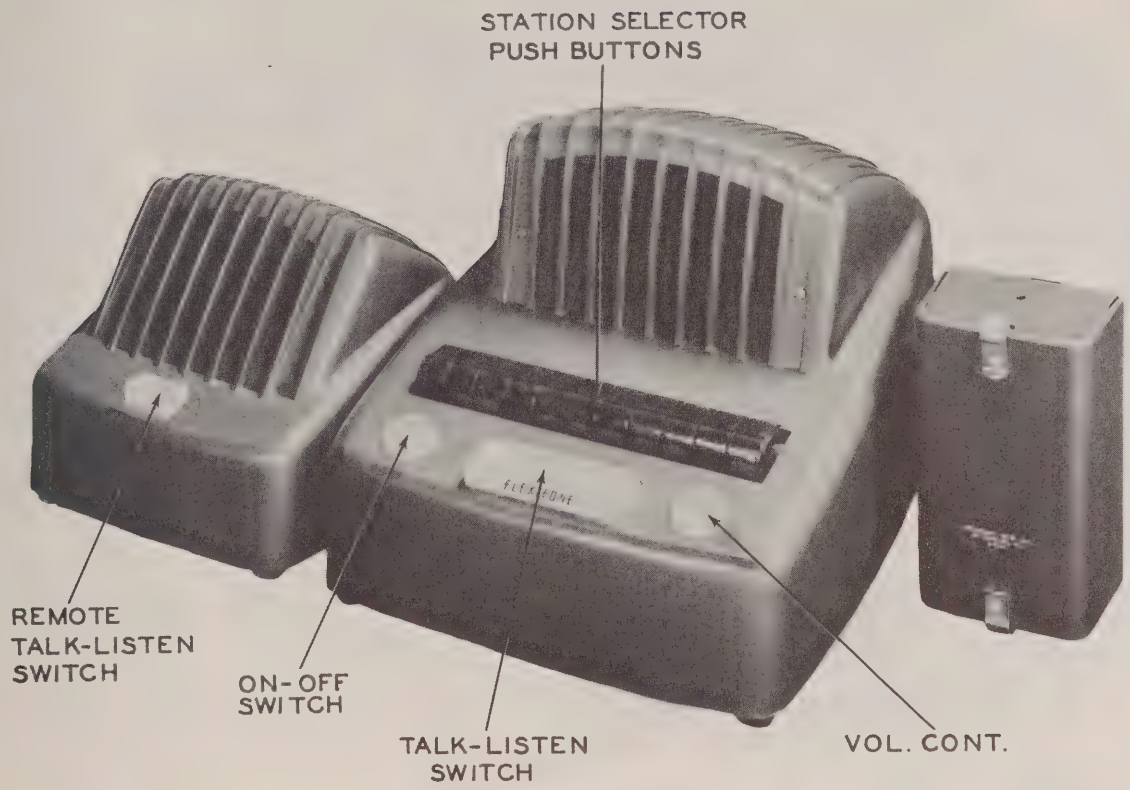

OPERADIO MODEL 4A35

TRADE NAME	Operadio (Flexifone), Models 4A35, 4A55
MANUFACTURER	Operadio Manufacturing Co. St. Charles, Ill.
TYPE SET	Three Tube Intercommunication System
TUBES (THREE)	Types 12SL7GT AF Amp., (2) 50L6GT Power Output
POWER SUPPLY	110-120 Volts AC or DC RATING .35 Amp. at 117 Volts AC

MODEL 4A35 IS ATEN KEY DUAL SERVICE MASTER STATION. MODEL 4A55 IS A TWENTY KEY DUAL SERVICE MASTER STATION. EACH STATION COMES SUPPLIED WITH ATTACHED PLUG-CABLE ASSEMBLY AND TERMINAL BOX OR BOXES AS REQUIRED. TWO TERMINAL BOXES ARE SUPPLIED WITH THE MODEL 4A55. SINCE ONLY ONE MASTER INPUT AND ONE REMOTE INPUT ARE REQUIRED FOR EACH MASTER STATION, ONE OF THE TERMINAL BOXES HAS BEEN DESIGNATED FOR THIS SERVICE AND IS IDENTIFIED BY A LETTER "A" STAMPED OR PAINTED INSIDE THE BOX. THE EQUIVALENT TERMINALS IN THE UNMARKED BOX ARE NOT USED.

A SERVICE SELECTOR STRIP IS MOUNTED ON THE REAR OF EACH STATION SELECTOR KEY BANK. THE JUMPER WIRES ARE CONNECTED FOR BOTHEMASTER TO MASTER AND MASTER TO REMOTE OPERATION AND MUST BE CUT IN THE PROPER PLACE BEFOR PLACING THE UNIT IN OPERATION. FOR MASTER TO MASTER OPERATION THE JUMPER MUST BE CUT BETWEEN 10 and REMOTE SPEAKER. SEE SCHEMATIC DIAGRAM. FOR MASTER TO REMOTE OPERATION THE JUMPER MUST BE CUT BETWEEN 1 and MASTER. FOR COMBINATION SERVICE THE JUMPER MUST BE CUT AT THE LAST CONNECTION FOR THE MASTER UNITS. THAT IS IF SEVEN MASTER STATIONS ARE USED THE JUMPER IS CUT BETWEEN 6 and 7.

OPERADIO
MODELS 4A35, 4A55

OPERADIO
MODELS 4A35, 4A55

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PARTS LIST AND DESCRIPTIONS

OPERADIO MODEL 4A35

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: OPERADIO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	AF Amp.	262-12002	12SL7GT	8BD	
V2	Power Output	262-50000	50L6GT	7AC	
V3	Power Output	262-50000	50L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OPERADIO PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	350	199-2923	AF862J4A *			EL-424 *	● Filter
B	20	350						■ Filter
C	10	350						▲ Filter
C2	20	150	199-2016-206	PRS150/20			UT-201	Filter
C3	20-125		199-9019		823-AN			Variable Feedback
C4	500	500	199-3001-501	1468-0005	D6-501	GP2K-500	1FM-35	Tone Compensation
C5	250	500	199-3001-251	1468-00025	D6-251	GP2K-250	1FM-325	AF Amp. Grid Bypass
C6	.003	600	199-4020-302	P688-003	D6-302	GP2M-003	TM-23	Audio Coupling
C7	.002	600	199-4020-202	P688-002	D6-202	GP2M-002	TM-22	Audio Coupling
C8	.05	400	199-4021-503	P488-05			TM-15	Audio Coupling
C9	.01	400	199-4020-103	P488-01	D6-103	821-01	TM-11	Tone Compensation
C10	.05	400	199-4021-503	P488-05			TM-15	Line Isolation
C11	.006	600	199-4030-602	P688-006	D6-562	GP2M-0056	TM-26	Line Filter

* Omit bypass section.

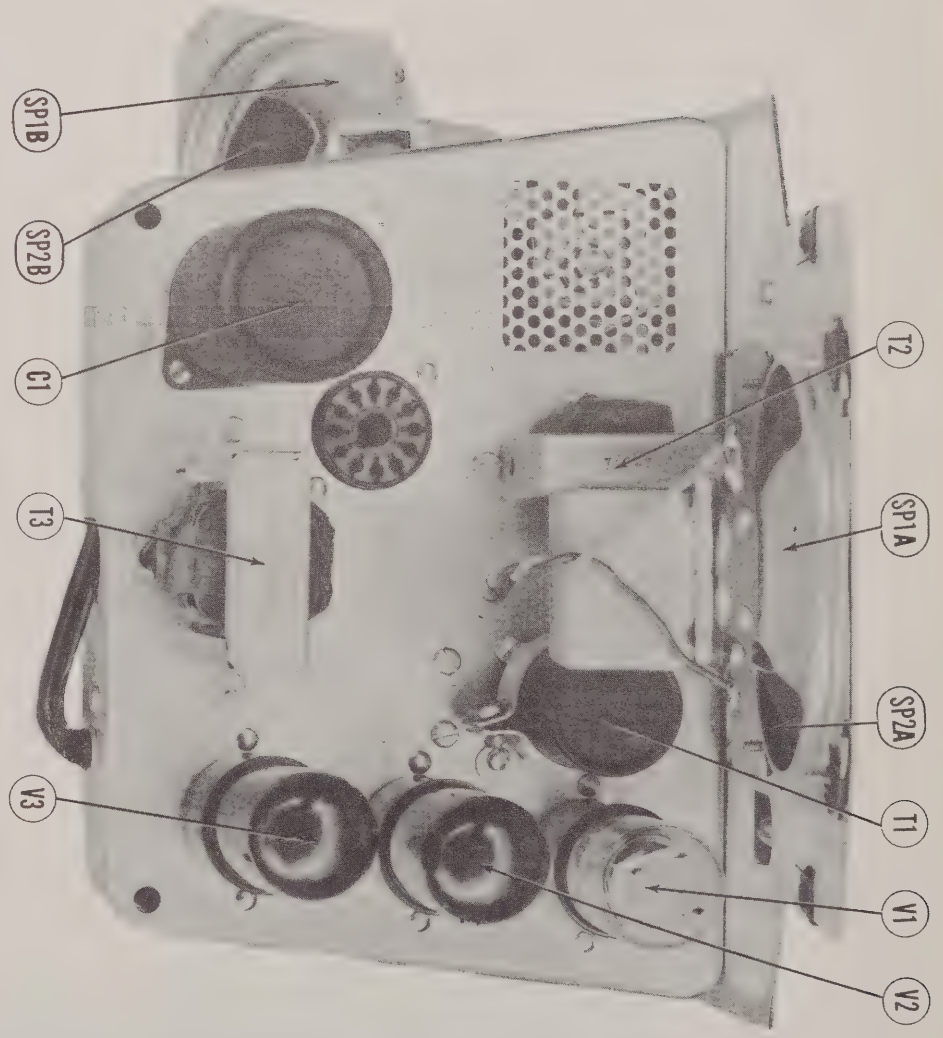
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OPERADIO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	100KΩ	½	601-28	Q13-128	AM-51-Z	AN-41	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Attach to R1A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OPERADIO PART No.	IRC PART No.	IDENTIFICATION CODES
R2	27KΩ	1	600-0116-273	BTA-27K	Input Transformer Shunt
R3	33KΩ	1	600-0116-333	BTA-33K	AF Amp. Grid
R4	100KΩ	1	600-0116-104	BTA-100K	AF Amp. Grid
R5	1000Ω	1	600-0116-102	BTA-1000	AF Amp. Cathode
R6	1000Ω	1	600-0116-102	BTA-1000	AF Amp. Cathode
R7	100KΩ	1	600-0116-104	BTA-100K	AF Amp. Grid
R8	2.2 Meg.	1	600-0116-225	BTA-2.2 Meg.	Feedback
R9	100KΩ	1	600-0116-104	BTA-100K	AF Amp. Plate
R10	100KΩ	1	600-0116-104	BTA-100K	AF Amp. Plate
R11	15KΩ	1	600-0116-153	BTA-15K	Output Grid
R12	82Ω	1	600-0116-820	BW-1-82	Output Cathode
R13	10KΩ	1	600-0116-103	BTA-10K	Filter
R14	4700Ω	1	600-0116-472	BW-1-4700	Filter
R15	250Ω	5	600-1008-251	AB-250	Filter-Wire Wound
R16	22Ω	1	600-0116-220		Surge Limiter
R17	150KΩ	1	600-0116-154	BTA-150K	Tone Compensation
R18	47Ω	1	600-0116-470	BW-1-47	Output Transformer Shunt
R19	500Ω	5	600-1008-501	AB-500	Filament Shunt-Wire Wound
R20	220KΩ	½	600-0043-224	BTS-220K	Series Neon Lamp

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (INPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO		DC RES.		OPERADIO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	TO SEC.	PRI.	SEC.					
T1	47.5	1	39Ω	.5Ω	710-7				
T2	1	43	5.4Ω CT	19KΩ	710-3021				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		OPERADIO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T3	19KΩ CT	73Ω	340Ω CT	2Ω	710-2026				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			OPERADIO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.				
SP1A	PM	73Ω	59503P3WCK4		4A07Z73	
B	PM	80Ω			4A07Z80	
	CONE DIA.	V. C. DIA.				
SP2A	4"	9/16"				
B	4"	9/16"				

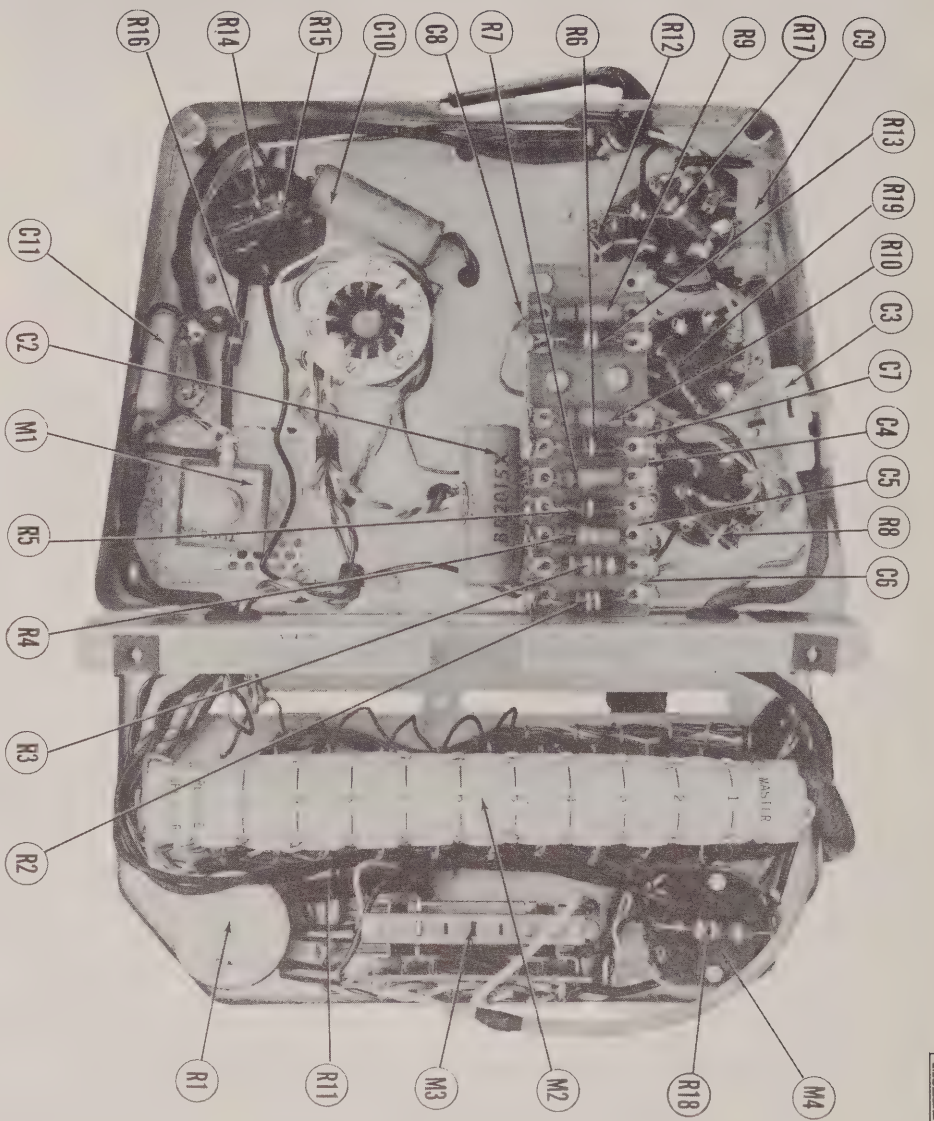
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	OPERADIO PART No.	SYLVANIA PART No.		
M1	.082A	595-2	NC-5		

MISCELLANEOUS

ITEM No.	PART NAME	OPERADIO PART No.	NOTES
M2	Switch	680-19	Station selector
M3	Switch	680-55	Talk-Listen
M4	Switch	680-56	On-Off
M5	Fuse	320-835-0050	.5 Amp. -Type 3AG
M6	Fuse	320-835-0050	.5 Amp. -Type 3AG
M7	Neon Lamp	456-8	Type NE-2
M8	Switch		Remote Talk-Listen

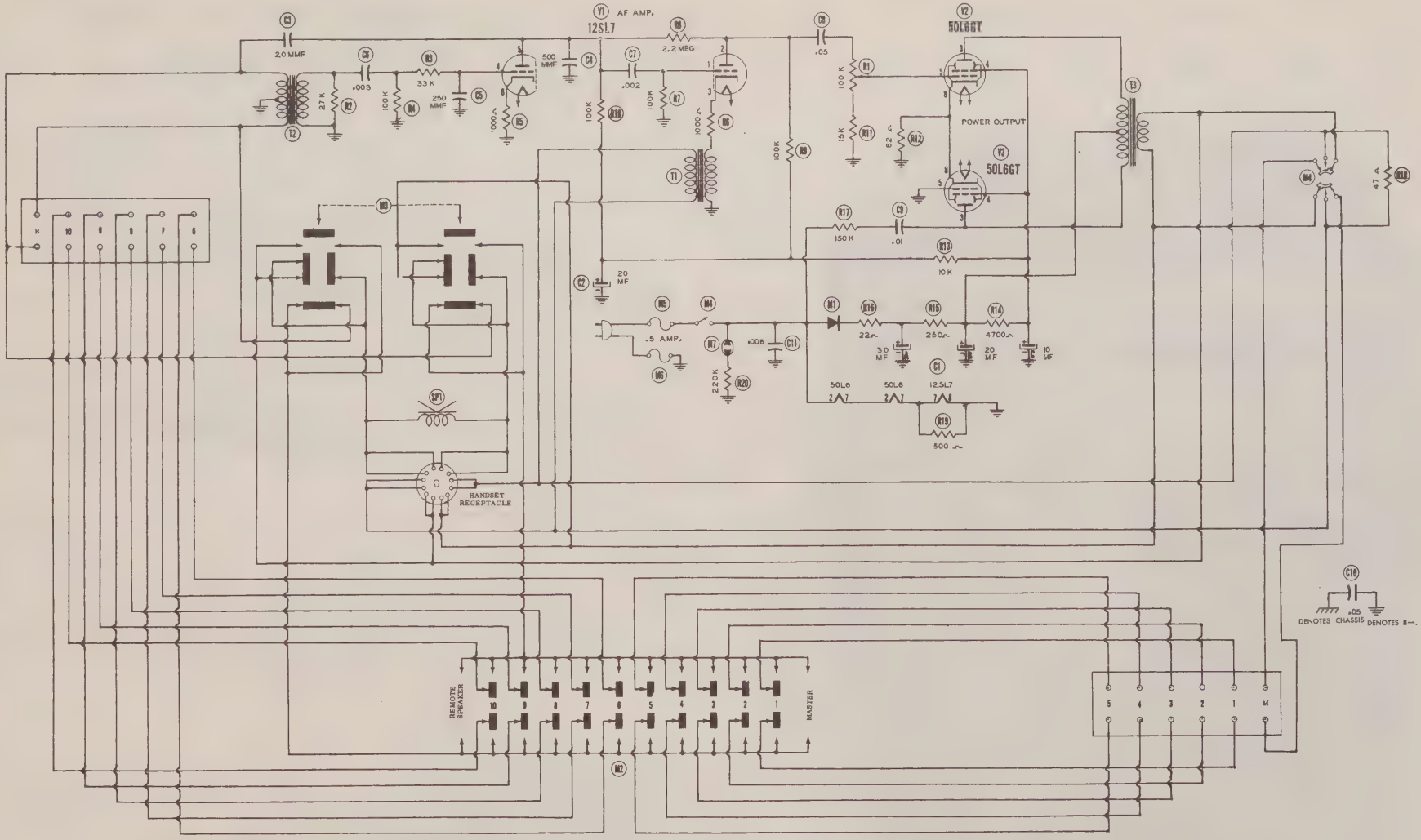
CHASSIS—BOTTOM VIEW



SET 100 FOLDER 9

OPERADIO MODEL 4A35

OPERADIO MODEL 4A35



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SL7GT	-.1VDC	50VDC	.4VDC	-.1VDC	48VDC	.4VDC	10VAC	0V.
V 2	50L6GT	0V.	60VAC	110VDC	90VDC	0V.	0V.	10VAC	6.8VDC
V 3	50L6GT	0V.	117VAC	110VDC	90VDC	0V.	68VDC	60VAC	6.8VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SL7GT	100KΩ	†100KΩ	1000Ω	133KΩ	†110KΩ	1000Ω	13Ω	0Ω
V 2	50L6GT	0Ω	80Ω	†422Ω	†4.9KΩ	17KΩ	Inf.	13Ω	82Ω
V 3	50L6GT	0Ω	110Ω	†422Ω	†4.9KΩ	0Ω	150KΩ	60Ω	82Ω

† MEASURED FROM OUTPUT OF M1.

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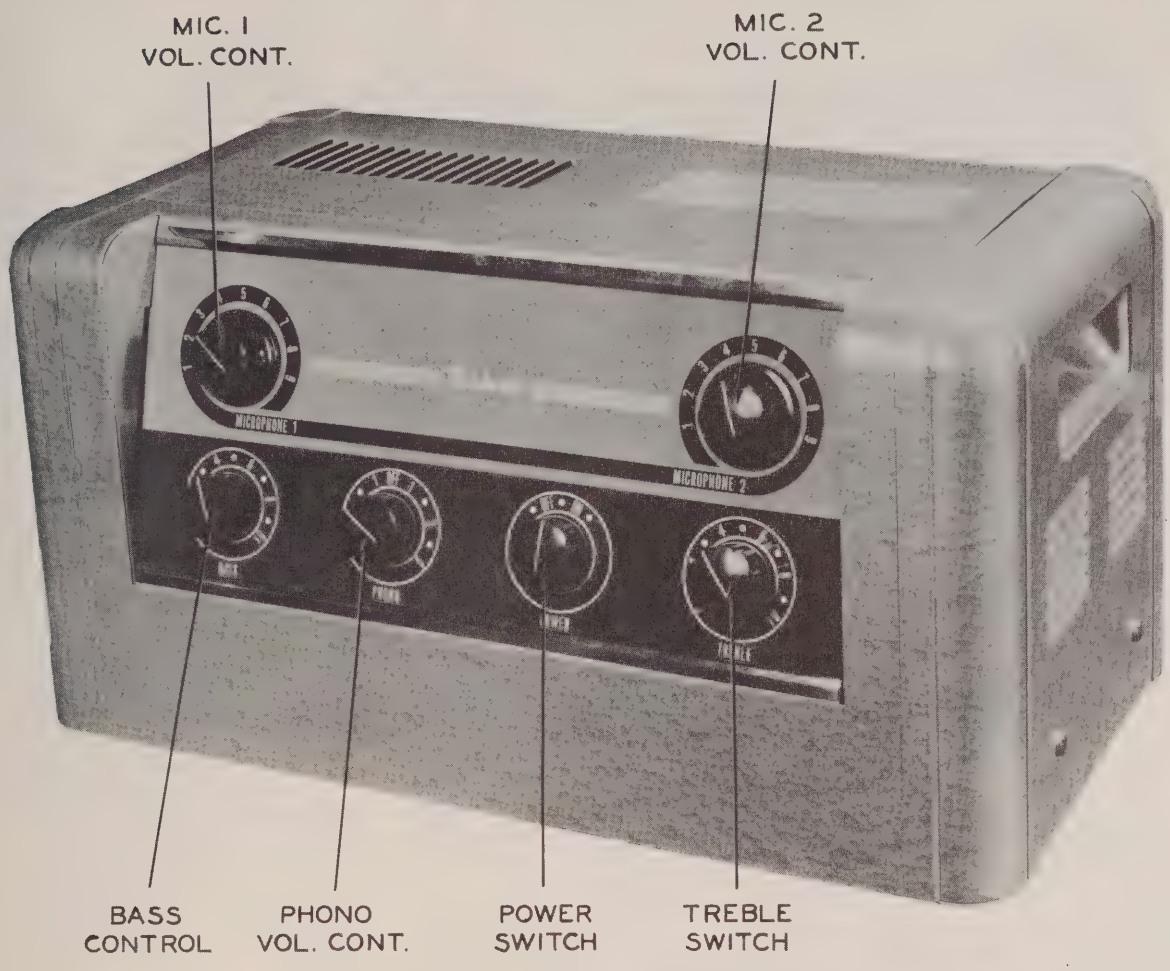
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



RAULAND
MODEL 1820

RAULAND
MODEL 1820

RAULAND MODEL 1820

TRADE NAME	Rauland, Model 1820
MANUFACTURER	Rauland-Borg Corp., 3523 W. Addison St., Chicago 18, Illinois
TYPE SET	AC Operated 4 Channel Audio Amplifier
TUBES (EIGHT)	Types 6J7 Mic. #1 Pre-Amp., 6J7 Mic. #2 Pre-Amp., 6SF5 Phono Pre-Amp., 6SC7 AF Amp., 6SC7 Phase Inverter, (2) 6L6 Power Output, 5U4G Rectifier
POWER SUPPLY	110-130 Volts AC RATING .9 Amp. at 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

RAULAND MODEL 1820

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RAULAND PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Mic. #1 Pre Amp.	6J7	6J7	7R	
V2	Mic. #2 Pre Amp.	6J7	6J7	7R	
V3	Phono Pre Amp.	6SF5	6SF5	6AB	
V4	AF Amp.	6SC7	6SC7	8S	
V5	Phase Inv.	6SC7	6SC7	8S	
V6	Power Output	6L6	6L6	7AC	
V7	Power Output	6L6	6L6	7AC	
V8	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RAULAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	CE-706A	AF2222J *			TVL-40	▲ Filter
B	10	450		PRS450/30				■ Filter
C	10	450						▲ Filter
D	10	450						Filter
C2	8	450	CE-805B	PRS450/8			UT-8	Decoupling
C3A	40	25		PRS150/40-40			TA-440	Mic. 1 Pre-Amp. Cath. Bypass
B	40	25						Mic. 2 Pre-Amp. Cath. Bypass
C4	30	150	CE-306D	PRS150/30			TVA-18	Phase Inv. Cath. Bypass
C5	30	150	CE-306D	PRS150/30			TVA-18	Output Cathode Bypass
C6	.05	600		P688-05			TM-15	Mic. 1 Screen Bypass
C7	.05	600		P688-05			TM-15	Mic. 2 Screen Bypass
C8	.02	400		P488-02			TM-12	Audio Coupling
C9	.02	400		P488-02			TM-12	Audio Coupling
C10	.05	600		P688-05			TM-15	Audio Coupling
C11	.002	600		P688-002	D6-202	GP2M-002	TM-22	Tone Compensation
C12	.03	600		P688-03			TM-13	Tone Compensation
C13	.05	600		P688-05			TM-15	Audio Coupling
C14	.05	600		P688-05			TM-15	Audio Coupling
C15	.002	1600		P1688-002			MB-22	Output Plate Bypass

* Parallel sections to obtain desired capacity.

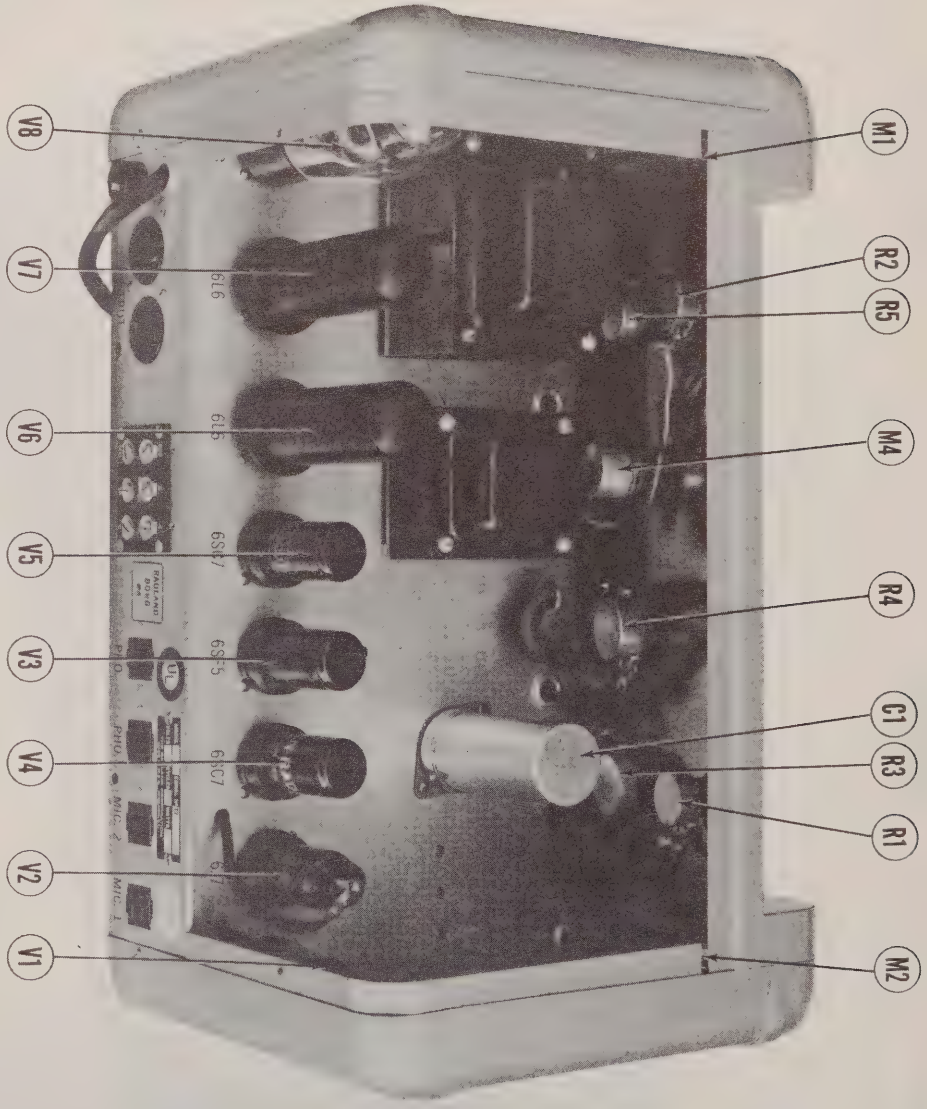
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RAULAND PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	RP-504B	Q13-133	AM-60-Z	BSK-60	Mic. #1 Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions
R2A	500KΩ	½	RP-504B	Q13-133	AM-60-Z	BSK-60	Mic. #2 Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R2A per instructions
R3	2 Meg.	½	RP-205B			B-77	Bass control
R4	1 Meg.	½	RP-105A	QVC-539X			Phono Volume control, tapped at 500KΩ
R5A	500KΩ	½	RP-504B	Q13-133	AM-60-Z	BSK-60	Treble control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R5A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RAULAND PART No.	IRC PART No.	IDENTIFICATION CODES
R6	2.2 Meg.	½		BTS-2.2 Meg.	Mic. 1 Pre-Amp. Grid
R7	2200Ω	½		BTS-2200	Mic. 1 Pre-Amp. Cathode
R8	2.2 Meg.	½		BTS-2.2 Meg.	Mic. 1 Pre-Amp. Screen
R9	470KΩ	½		BTS-470K	Mic. 1 Pre-Amp. Plate
R10	2.2 Meg.	½		BTS-2.2 Meg.	Mic. 2 Pre-Amp. Grid
R11	2200Ω	½		BTS-2200	Mic. 2 Pre-Amp. Cathode
R12	2.2 Meg.	½		BTS-2.2 Meg.	Mic. 2 Pre-Amp. Screen
R13	470KΩ	½		BTS-470K	Mic. 2 Pre-Amp. Plate
R14	47KΩ	1		BTA-47K	Phono Pre-Amp. Plate
R15	470Ω	½		BTS-470	1st AF Amp. Cathode
R16	10Ω	½		BW-½-10	Feedback Network
R17	3300Ω	½		BTS-3300	Feedback Network
R18	10KΩ	½		BTS-10K	Decoupling

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RAULAND PART No.	IRC PART No.	
R19	47KΩ	½		BTS-47K	2nd AF Amp. Grid
R20	1000Ω	½		BTS-1000	2nd AF Amp. Cathode
R21	100KΩ	½		BTS-100K	2nd AF Amp. Plate
R22	3900Ω	½		BTS-3900	Phase Inv. Grid
R23	100KΩ	½		BTS-100K	Phase Inv. Plate
R24	100KΩ	½		BTS-100K	Output Grid
R25	100KΩ	½		BTS-100K	Output Grid
R26	200Ω	10		AB-200	Output Cathode-Wire Wound
R27	4700Ω	½		BTS-4700	Filter
R28	5000Ω	10		AB-5000	Filter-Wire Wound

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	RAULAND PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ .9A	600VCT .113ADC	5VAC @ 3A	6.3VCT 3.6A	LP-0185	P-6013 ①	P-2953 ①	PH-120 ① ②

① Add series resistor to reduce plate voltage.
② Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		RAULAND PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	5.2KΩ CT	500Ω 250Ω 16Ω 8Ω 4Ω	142Ω CT	11Ω 7.3Ω .5Ω .4Ω .3Ω	LO-0104	A-3800②		PCO-80 ②	② Drill new mounting holes.

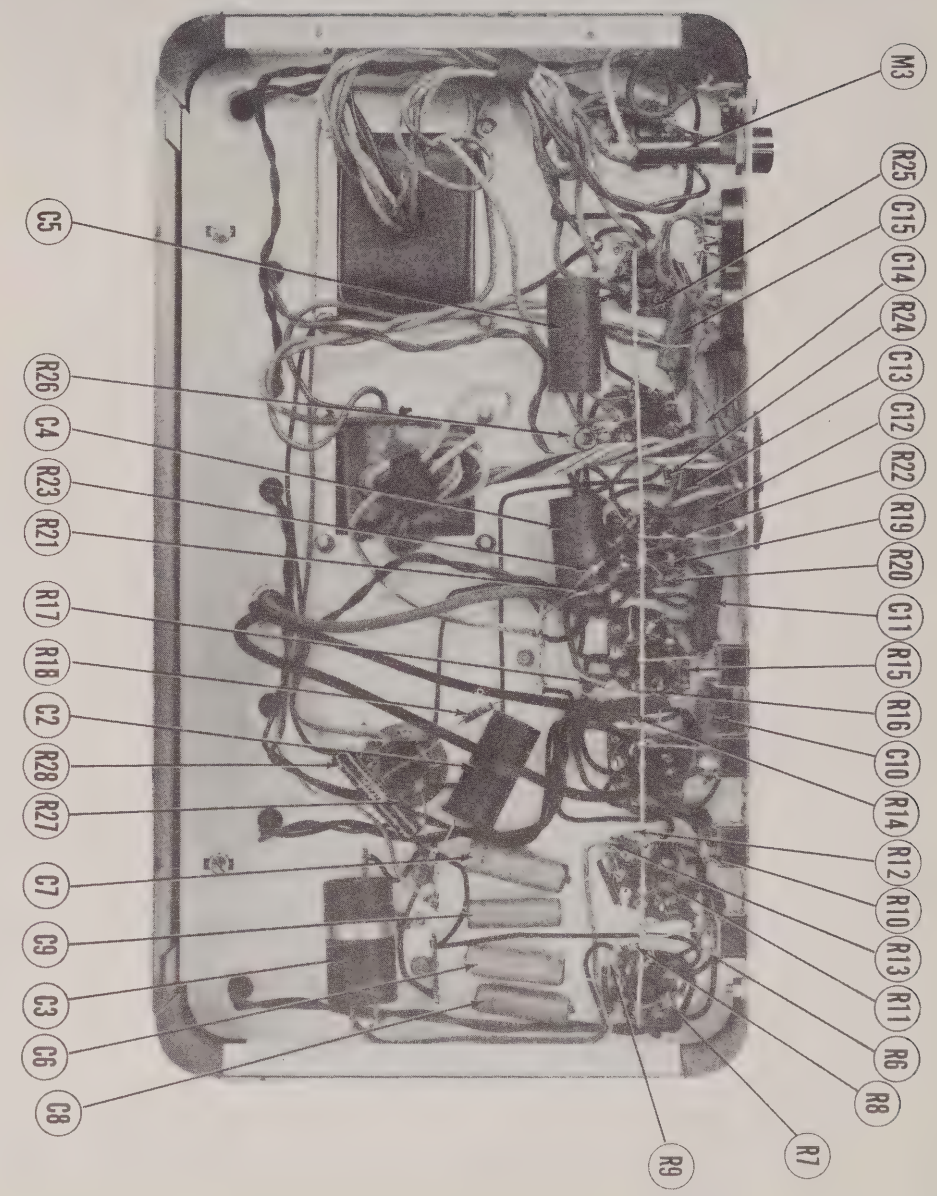
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					RAULAND PART No.		
M1	Bayonet	6-8	.25	Blue			Type #44
M2	Bayonet	6-8	.25	Blue			Type #44

MISCELLANEOUS

ITEM No.	PART NAME	RAULAND PART No.	NOTES
M3	Fuse		3 Amp. 250V-Type AGC
M4	Switch	X-0235	Power On-Off

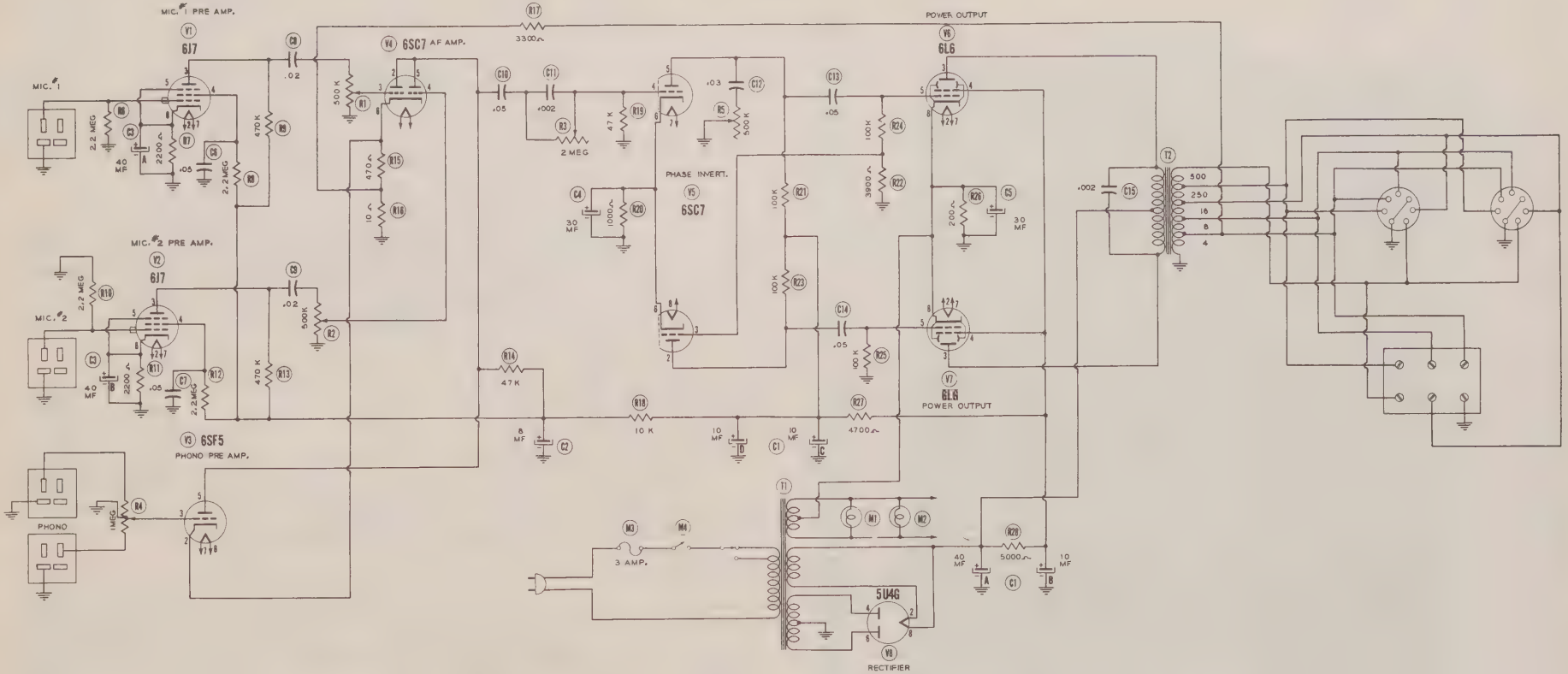
CHASSIS—BOTTOM VIEW



SET 100 FOLDER 10

RAULAND MODEL 1820

RAULAND MODEL 1820



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	TOP CAP
V 1	6J7	0V.	▲6.3VAC	75VDC	27VDC	.8VDC	240VDC	▲6.3VAC	.8VDC	0V.
V 2	6J7	0V.	▲6.3VAC	75VDC	27VDC	.8VDC	240VDC	▲6.3VAC	.8VDC	0V.
V 3	6SF5	0V.	1.1VDC	0V.	0V.	135VDC	0V.	▲6.3VAC	▲6.3VAC	
V 4	6SC7	0V.	135VDC	0V.	0V.	135VDC	1.1VDC	▲6.3VAC	▲6.3VAC	
V 5	6SC7	0V.	185VDC	0V.	0V.	185VDC	1.7VDC	▲6.3VAC	▲6.3VAC	
V 6	6L6	0V.	▲6.3VAC	350VDC	310VDC	0V.	0V.	▲6.3VAC	21VDC	
V 7	6L6	0V.	▲6.3VAC	350VDC	310VDC	0V.	0V.	▲6.3VAC	21VDC	
V 8	5U4G	0V.		360VDC	0V.	300VAC	0V.	300VAC	360VDC	

▲ MEASURED ACROSS FILAMENTS.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	TOP CAP
V 1	6J7	0Ω	200Ω	†490KΩ	†2.2 Meg.	2.2KΩ	†18KΩ	200Ω	2.2KΩ	2.2Meg.
V 2	6J7	0Ω	200Ω	†490KΩ	†2.2 Meg.	2.2KΩ	20KΩ	200Ω	2.2KΩ	2.2 Meg.
V 3	6SF5	0Ω	480Ω	500KΩ	2 Meg.	†65KΩ	10Ω	200Ω	200Ω	
V 4	6SC7	0Ω	†65KΩ	17Ω	12Ω	†65KΩ	480Ω	200Ω	200Ω	
V 5	6SC7	0Ω	†110KΩ	3.9KΩ	47KΩ	†110KΩ	1000Ω	200Ω	200Ω	
V 6	6L6	0Ω	200Ω	†75Ω	†5KΩ	105KΩ	12Ω	200Ω	200Ω	
V 7	6L6	0Ω	200Ω	†75Ω	†5KΩ	100KΩ	Inf.	200Ω	200Ω	
V 8	5U4G	Inf.	80KΩ	Inf.	50Ω	Inf.	50Ω	Inf.	80KΩ	

† MEASURED FROM PIN 8 OF V8.

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

PHOTOFACT* Folder

SENTINEL MODELS
412, 413, 414, 415 (SERIES YA, YB, YC, YD, YE, YF)

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MODEL 415

SENTINEL MODELS
412, 413, 414, 415 (SERIES YA, YB, YC, YD, YE, YF)

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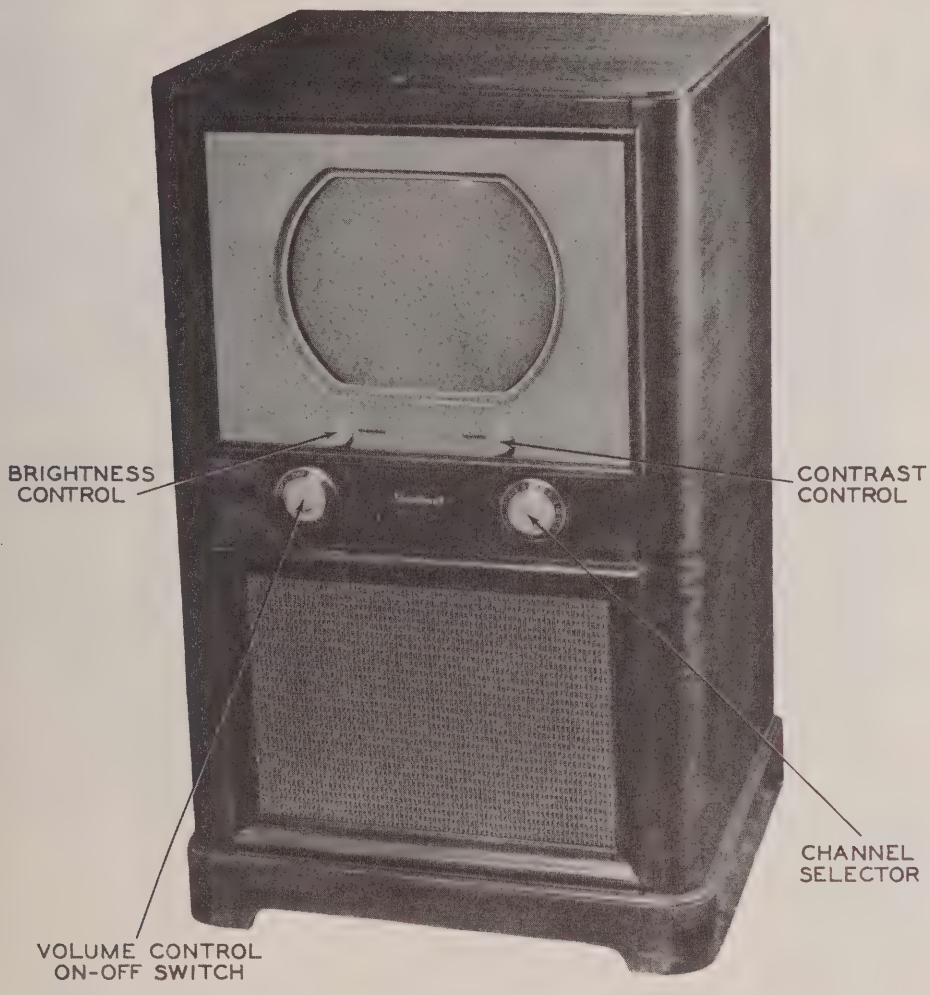
Date 7/50 Set No. 100—Folder No. 11

PHOTOFACT* Folder
*TRADE MARK

SENTINEL
MODELS 412, 413, 414, 415



SENTINEL MODEL 415

TRADE NAME	Sentinel Models 412, 413, 414, 415 (Series YA, YB, YC, YD, YE, YF)
MANUFACTURER	Sentinel Radio Corp., 2100 W. Dempster, Evanston, Illinois
TYPE SET	Television Receiver
TUBES	Twenty One
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING 1.7 Amp. at 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

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SENTINEL
MODELS 412, 413, 414, 415

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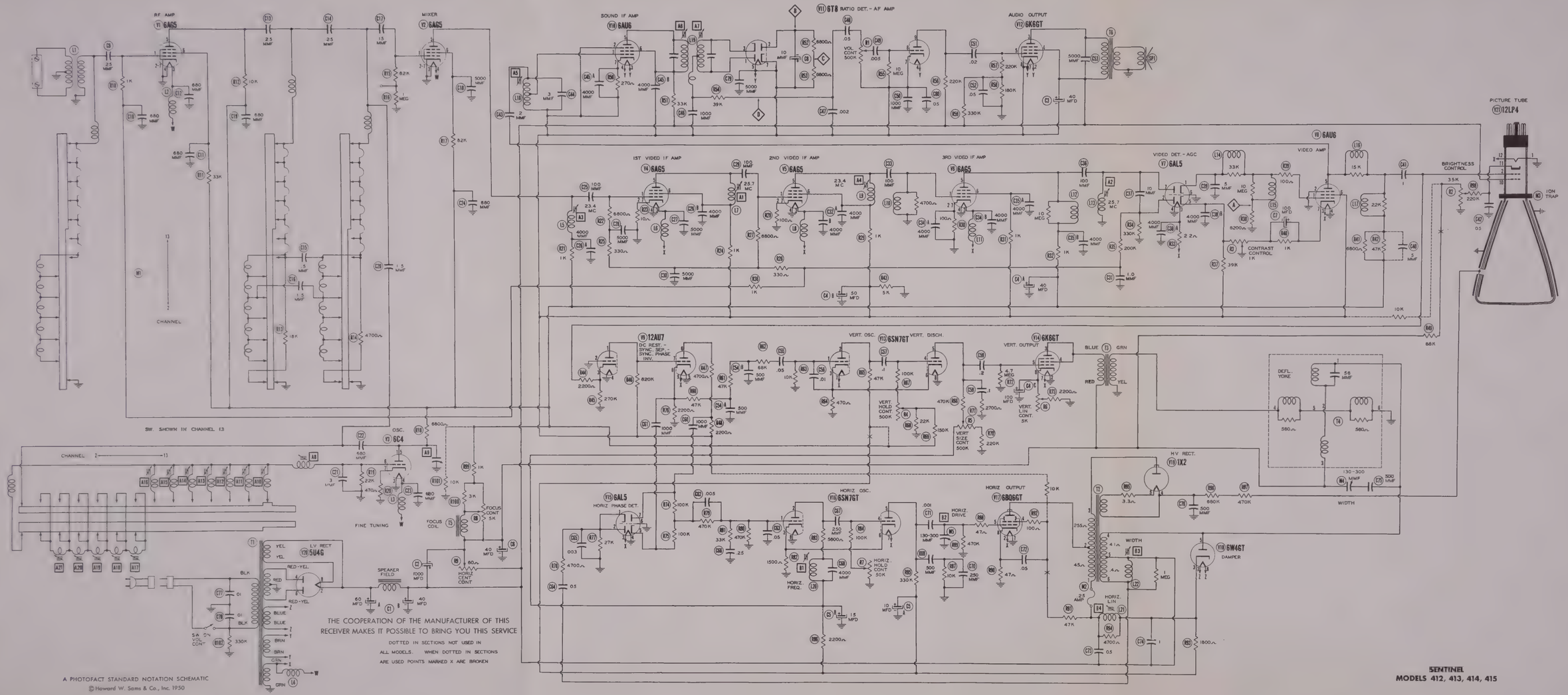
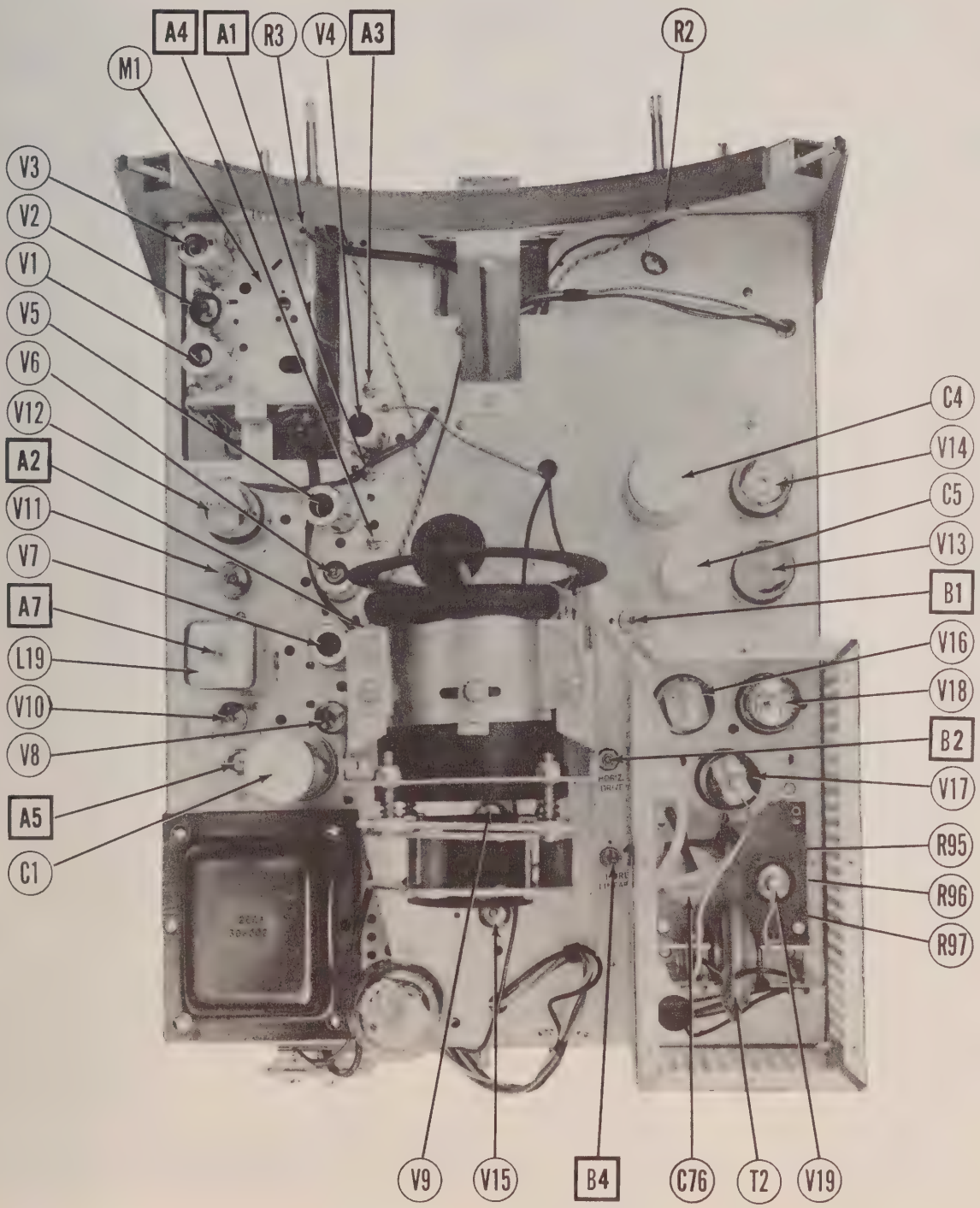
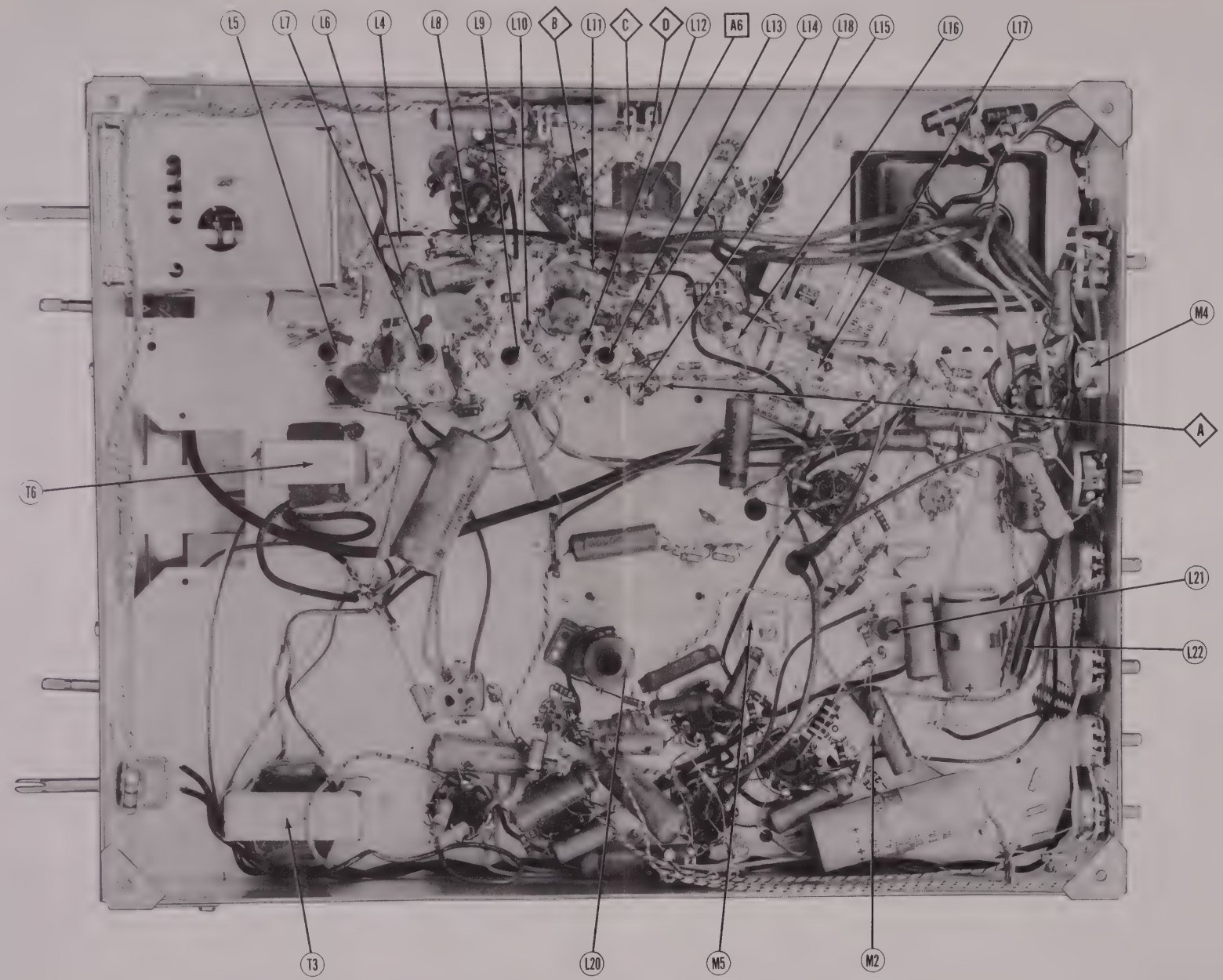
DATE 7-50 SET 100 FOLDER 11



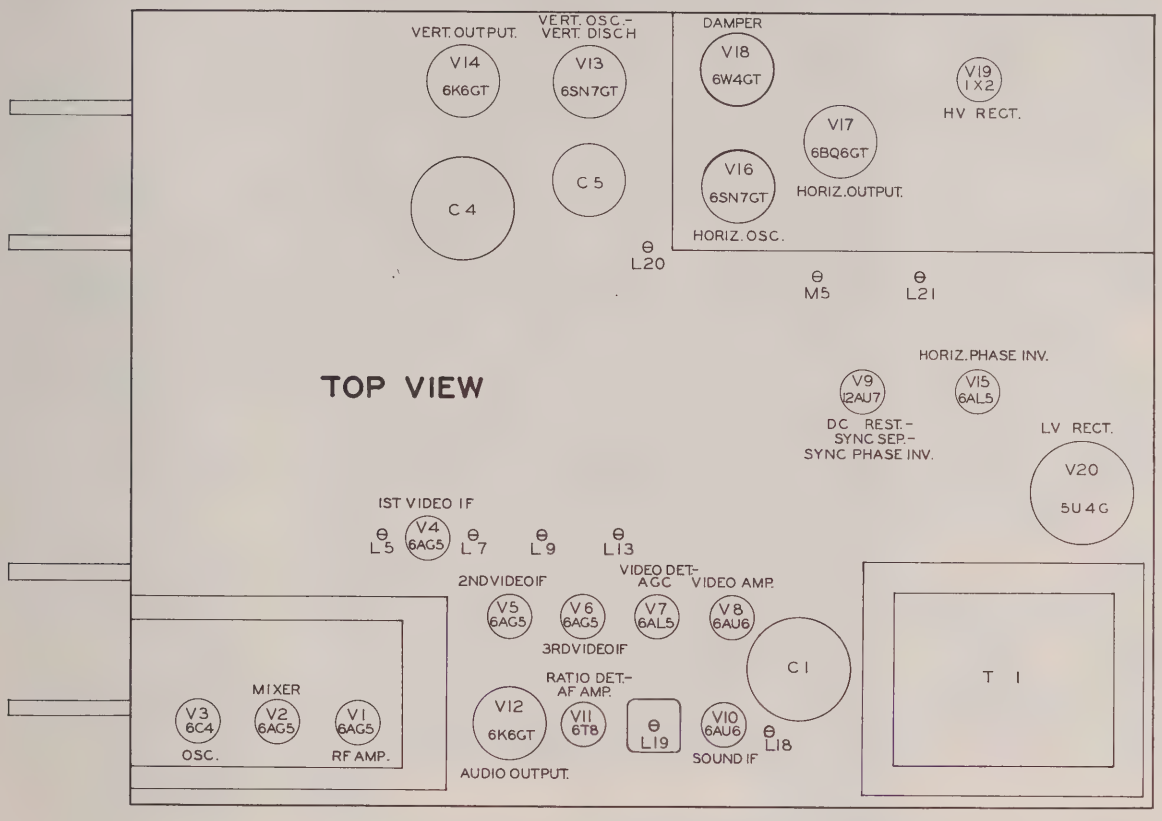
SENTINEL
MODELS 412, 413, 414, 415

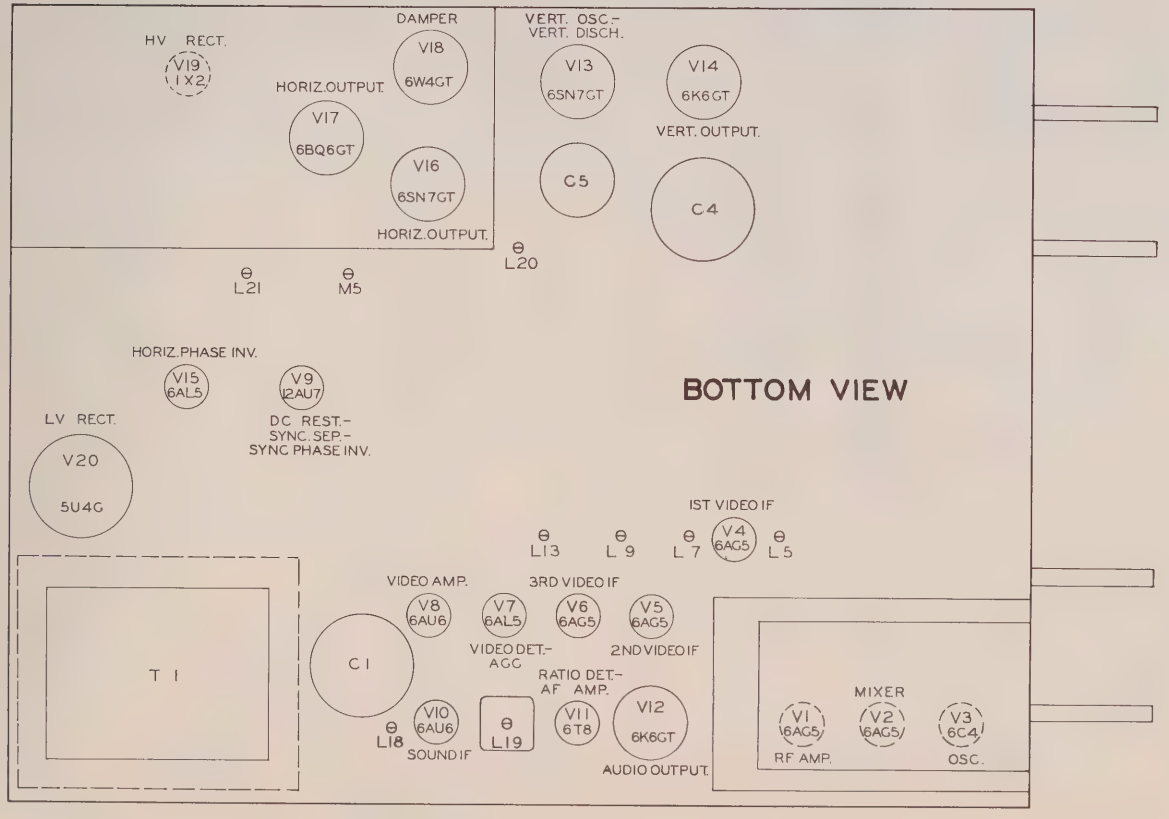


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be securely taped and dressed away from the chassis. Do not remove the horizontal oscillator tube.

VIDEO IF ALIGNMENT

Remove the local oscillator tube (V3) from its socket to prevent erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	25.75MC (Unmod.)	Any	DC Probe to Point (A). Common to chassis.	A1, A2	Adjust for maximum deflection.
2.	Direct	"	23.4MC	"	"	A3, A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	24MC (10MC SWP)	21.25MC 25.75MC	Any	Vert. Amp. to Point (A). Low side to chassis.		Check for response curve similar to figure 1. If necessary retouch A1 thru A4 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

During sound IF alignment the common lead of the VTVM is connected to -140 volts with respect to chassis. Avoid grounding or touching the VTVM case.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V10). Low side to chassis.	4.5MC (Unmod.)	Any	DC Probe to Point (B). Common to Point (C).	A5, A6	Adjust for maximum deflection.
5.	.01MFD	"	"	"	DC Probe to Point (D). Common to Point (E).	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V10). Low side to chassis.	4.5MC (450KC Sweep)	4.5MC	Any	Vert. Amp. to Point (B). Low side to chassis.	A5, A6	Disconnect stabilizer capacitor C8. Adjust for maximum amplitude and symmetry as per figure 2.
5.	.01MFD	"	"	"	"	Vert. Amp. to Point (D). Low side to chassis.	A7	Reconnect capacitor C8. Adjust A7 so 4.5MC occurs at center of crossover lines as shown in figure 3. Slightly retouch A6 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

If any of the individual channel oscillator adjustment screws for channels 7 thru 13 show insufficient range, it will be necessary to adjust the high band oscillator padder (A8). If A8 is adjusted, readjustment of all high band oscillator adjustments will be necessary.

If any of the individual channel oscillator screws on channels 2 thru 6 show insufficient range, it will be necessary to adjust the overall oscillator padder (A9). If A9 is adjusted, it will be necessary to readjust ALL individual channel oscillator screws.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	213MC (10MC SWP)	211.25MC 215.75MC	13	Vert. Amp. to Point (A). Low side to chassis.	A10	Adjust to place video marker as shown in figure 4.
			207MC (10MC SWP)	205.25MC 209.75MC	12		A11	
			201MC (10MC SWP)	199.25MC 203.75MC	11		A12	
			195MC (10MC SWP)	193.25MC 187.75MC	10		A13	
			189MC (10MC SWP)	187.25MC 191.75MC	9		A14	
			183MC (10MC SWP)	181.25MC 185.75MC	8		A15	
			177MC (10MC SWP)	175.25MC 179.75MC	7		A16	
			85MC (10MC SWP)	83.25MC 87.75MC	6		A17	
			79MC (10MC SWP)	77.25MC 81.75MC	5		A18	
			69MC (10MC SWP)	67.25MC 71.75MC	4		A19	
			63MC (10MC SWP)	61.25MC 65.75MC	3		A20	
			57MC (10MC SWP)	55.25MC 59.75MC	2		A21	

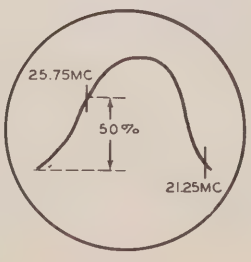


FIG.1

FIG. 2

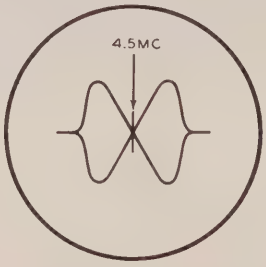


FIG.3

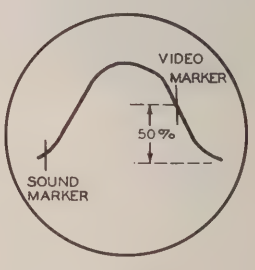
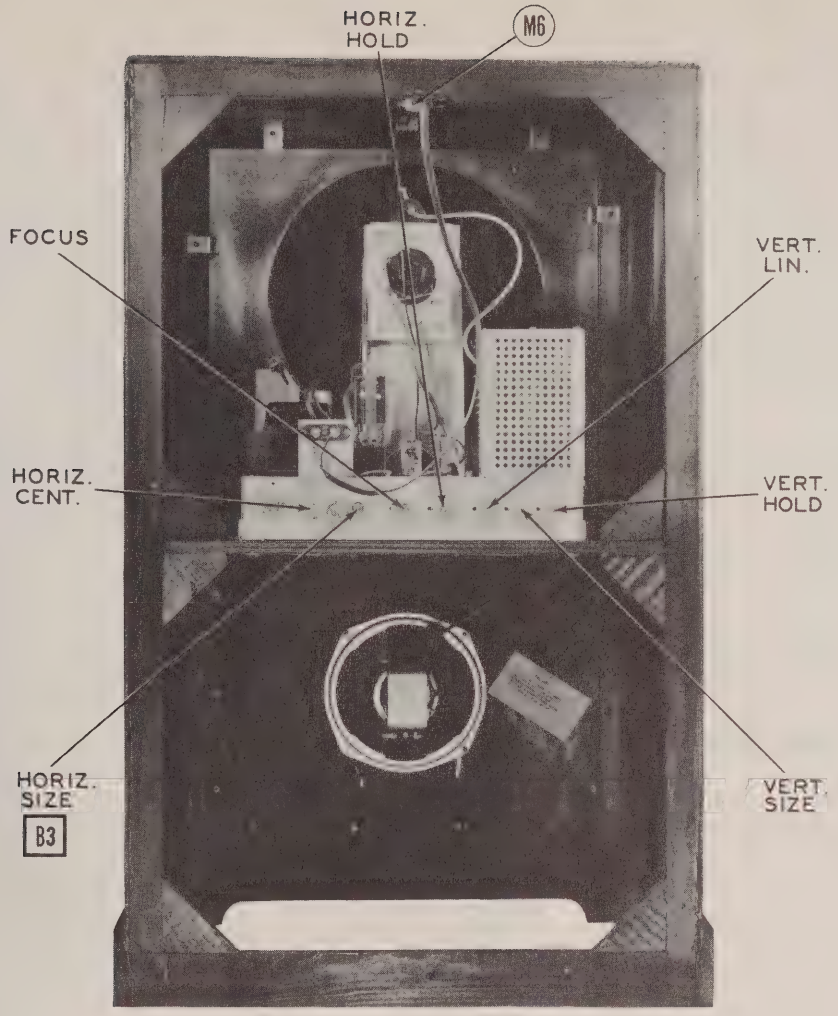


FIG.4



CABINET–REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal hold control to the mid-position of its range.

Adjust the horizontal frequency slug (B1) to the center of the range over which the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) clockwise as far as possible without crowding the right half of the picture.

Adjust the width slug (B3) until the picture is of proper size horizontally.

Adjust the horizontal linearity slug (B4) until the picture is symmetrical from left to right. Readjustment of B2 may be necessary to obtain optimum results.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs from front of set.
2. Remove nine phillips head screws holding rear cover. Remove cover.
3. Disconnect built-in antenna leads at chassis terminal. Slip lead through guide ring mounted on HV shield.
4. Remove one phillips head screw holding speaker socket to speaker plug. Disconnect plug. Pull speaker lead up through hole in cabinet.
5. Remove six large phillips head screws holding chassis at bottom. Remove chassis.
6. Remove four 1/4" hex nuts holding speaker. Remove speaker.

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-.8VDC	0V.	6.3VAC	0V.	145VDC	160VDC	0V.		
V 2	6AG5	0V.	0V.	0V.	6.3VAC	255VDC	155VDC	0V.		
V 3	6C4	185VDC	0V.	0V.	6.3VAC	185VDC	§-4.5VDC	5.2VDC		
V 4	6AG5	-1.8VDC	.1VDC	6.3VAC	0V.	125VDC	125VDC	.1VDC		
V 5	6AG5	-.8VDC	.4VDC	6.3VAC	0V.	125VDC	125VDC	.4VDC		
V 6	6AG5	0V.	.9VDC	6.3VAC	0V.	250VDC	130VDC	.9VDC		
V 7	6AL5	2.9VDC	-1.8VDC	5.8VAC	0V.	0V.	0V.	0V.		
V 8	6AU6	.7VDC	0V.	6.3VAC	0V.	250VDC	130VDC	4VDC		
V 9	12AU7	17VDC	0V.	2VDC	0V.	0V.	80VDC	17VDC	18VDC	6.3VAC
V 10	6AU6	♦0V.	♦0V.	♦0V.	♦6.3VAC	♦85VDC	♦85VDC	♦1VDC		
V 11	6T8	♦-.3VDC	♦-.7VDC	♦-.5VDC	♦6.3VAC	♦0V.	♦0V.	♦0V.	♦-.4VDC	♦85VDC
V 12	6K6GT	♦0V.	♦6.3VAC	♦200VDC	♦225VDC	♦-4.5VDC	♦-5.6VDC	♦0V.	♦0V.	
V 13	6SN7GT	0V.	110VDC	3VDC	-27VDC -6.2VDC	70VDC 12VDC	3VDC	6.3VAC	0V.	
V 14	6K6GT	0V	0V.	340VDC	340VDC	0V.	355VDC	6.3VAC	46VDC 35VDC	
V 15	6AL5	-.1VDC	-.1VDC	6.3VAC	0V.	8.2VDC	0V.	-2.6VDC		
V 16	6SN7GT	.7VDC	110VDC	15VDC	-4.4VDC -3.5VDC	130VDC	15VDC	6.3VAC	0V.	
V 17	6BQ6GT	440VDC	6.3VAC	120VDC	120VDC	-12VDC	-1.8VDC	0V.	3.5VDC	TOP CAP *
V 18	6W4GT	400VDC	380VDC	440VDC	355VDC	380VDC	0V.	¶	¶	
V 19	1X2	* DO NOT MEASURE.								
V 20	5U4G	0V.	380VDC	0V.	350VAC	0V.	350VAC	0V.	380VDC	
V 21	12LP4	0V.	2VDC	PIN 10 355VDC	PIN 11 125VDC	PIN 12 6.3VAC				

§ TAKEN WITH VACUUM TUBE VOLTMETER.
♦ MEASURED FROM PIN 8 OF V12.
* DO NOT MEASURE.
¶ 6.3VAC MEASURED ACROSS FILAMENTS.

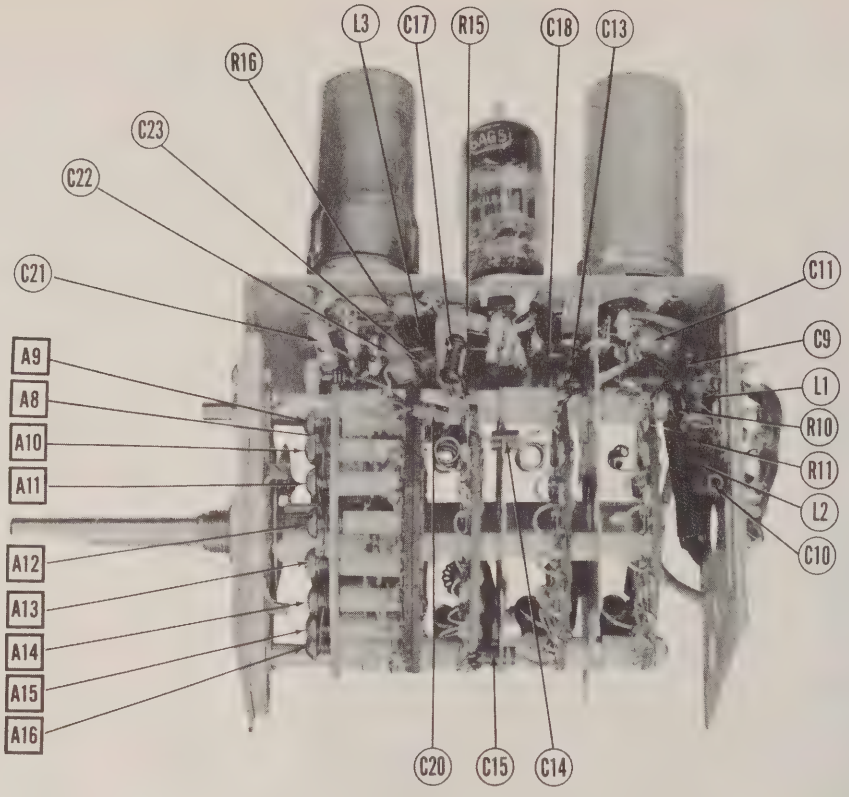
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	530KΩ	0Ω	.1Ω	0Ω	▲13KΩ	▲36KΩ	0Ω		
V 2	6AG5	1 Meg.	0Ω	0Ω	.1Ω	▲4KΩ	▲85KΩ	0Ω		
V 3	6C4	▲10KΩ	Inf.	0Ω	.1Ω	▲10KΩ	22KΩ	470Ω		
V 4	6AG5	537KΩ	10Ω	.1Ω	0Ω	♦1000Ω	♦1000Ω	10Ω		
V 5	6AG5	537KΩ	100Ω	.1Ω	0Ω	♦1000Ω	♦1000Ω	100Ω		
V 6	6AG5	4.1Ω	100Ω	.1Ω	0Ω	▲4KΩ	♦1000Ω	100Ω		
V 7	6AL5	8.2KΩ	330KΩ	1.6Ω	0Ω	0Ω	0Ω	.4Ω		
V 8	6AU6	8.3KΩ	0Ω	.1Ω	0Ω	▲9KΩ	♦0Ω	2000Ω		
V 9	12AU7	♦820KΩ	0Ω	270KΩ	0Ω	0Ω	#7KΩ	♦820KΩ	2.2KΩ	.1Ω
V 10	6AU6	♦1Ω	♦0Ω	♦0Ω	♦.1Ω	▲33KΩ	▲33KΩ	♦270Ω		
V 11	6T8	♦Inf.	♦13.6KΩ	♦Inf.	♦.1Ω	♦0Ω	♦0Ω	♦0Ω	♦10 Meg.	▲220KΩ
V 12	6K6GT	0Ω	♦.1Ω	▲460Ω	▲100Ω	400KΩ	130KΩ	♦0Ω	♦0Ω	
V 13	6SN7GT	10KΩ	#50KΩ	470Ω	120KΩ 620KΩ	#400KΩ #800KΩ	470Ω	.1Ω	0Ω	
V 14	6K6GT	0Ω	0Ω	▲1.3KΩ	▲1.3KΩ	4.7 Meg.	▲100Ω	.1Ω	7.2KΩ 2.2KΩ	
V 15	6AL5	27KΩ	27KΩ	.1Ω	0Ω	1 Meg.	0Ω	1 Meg.		
V 16	6SN7GT	470KΩ	#10KΩ	1.5KΩ	100KΩ 150KΩ	#330KΩ	1.5KΩ	.1Ω	0Ω	
V 17	6BQ6GT	#25Ω	.1Ω	#47KΩ	#47KΩ	470KΩ	7Ω	0Ω	47Ω	TOP CAP #60Ω
V 18	6W4GT	#1.8KΩ	▲0Ω	#0Ω	40KΩ	▲100Ω	Inf.	Inf.	Inf.	
V 19	1X2	InfΩ	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.
V 20	5U4G	Inf.	85KΩ	Inf.	44Ω	Inf.	44Ω	Inf.	85KΩ	
V 21	12LP4	0Ω	272KΩ	PIN 10 ▲100Ω	PIN 11 250KΩ	PIN 12 .1Ω				

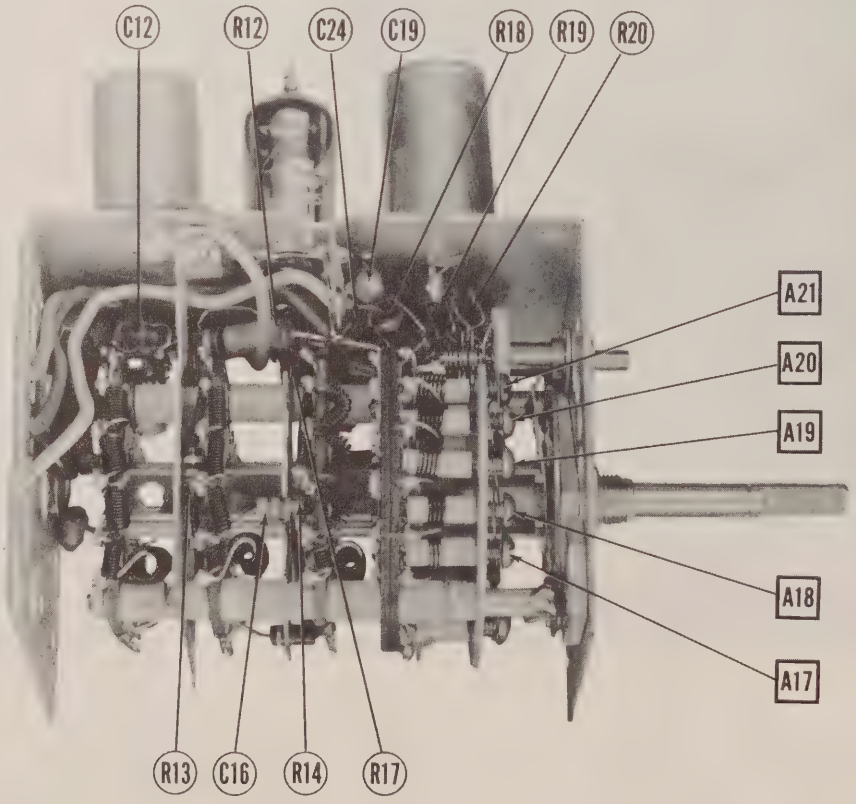
TOP CAP #320Ω

MEASURED FROM PIN 3 OF V18.
▲ MEASURED FROM PIN 2 OF V20.
♦ MEASURED FROM PIN 8 OF V12.

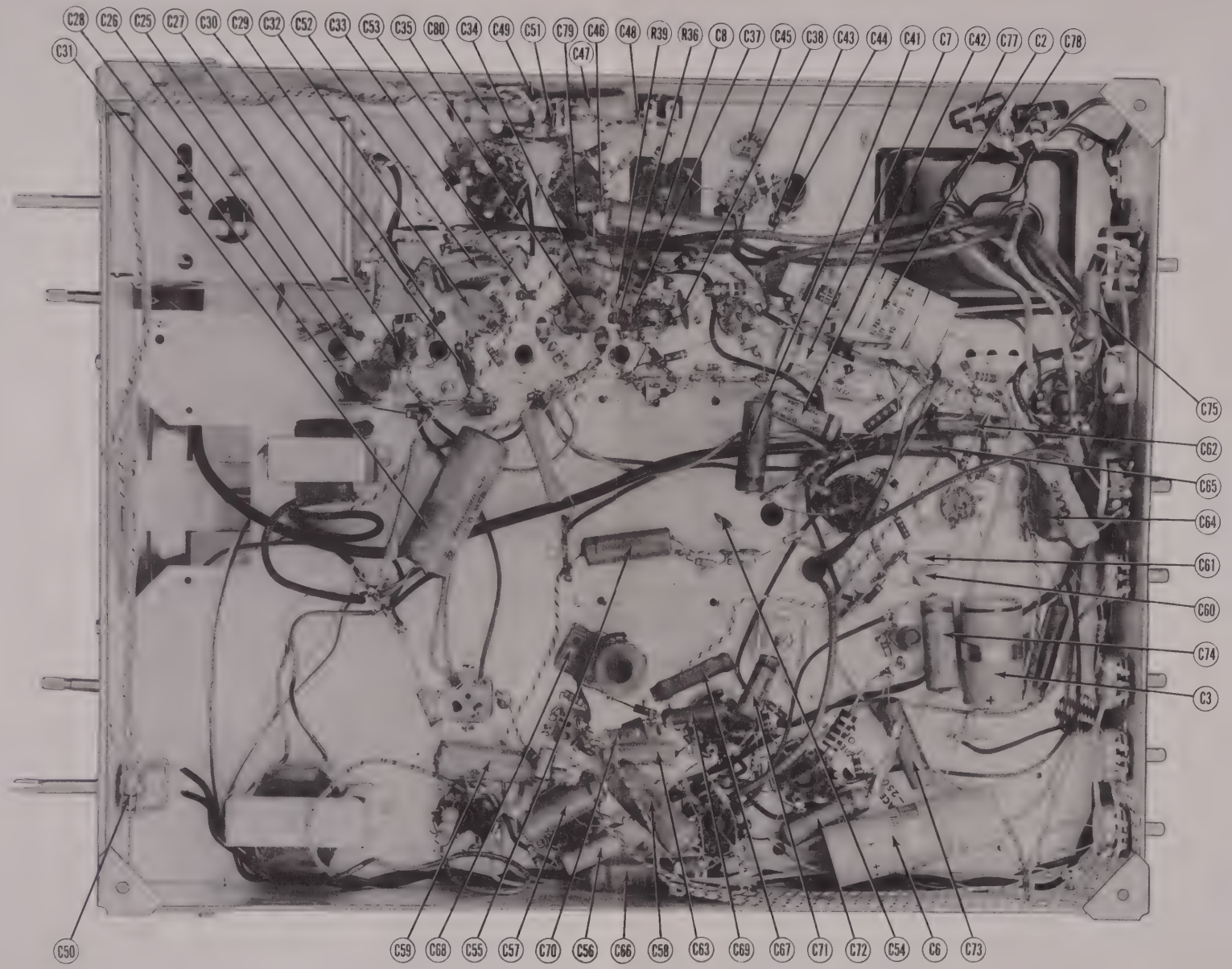
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



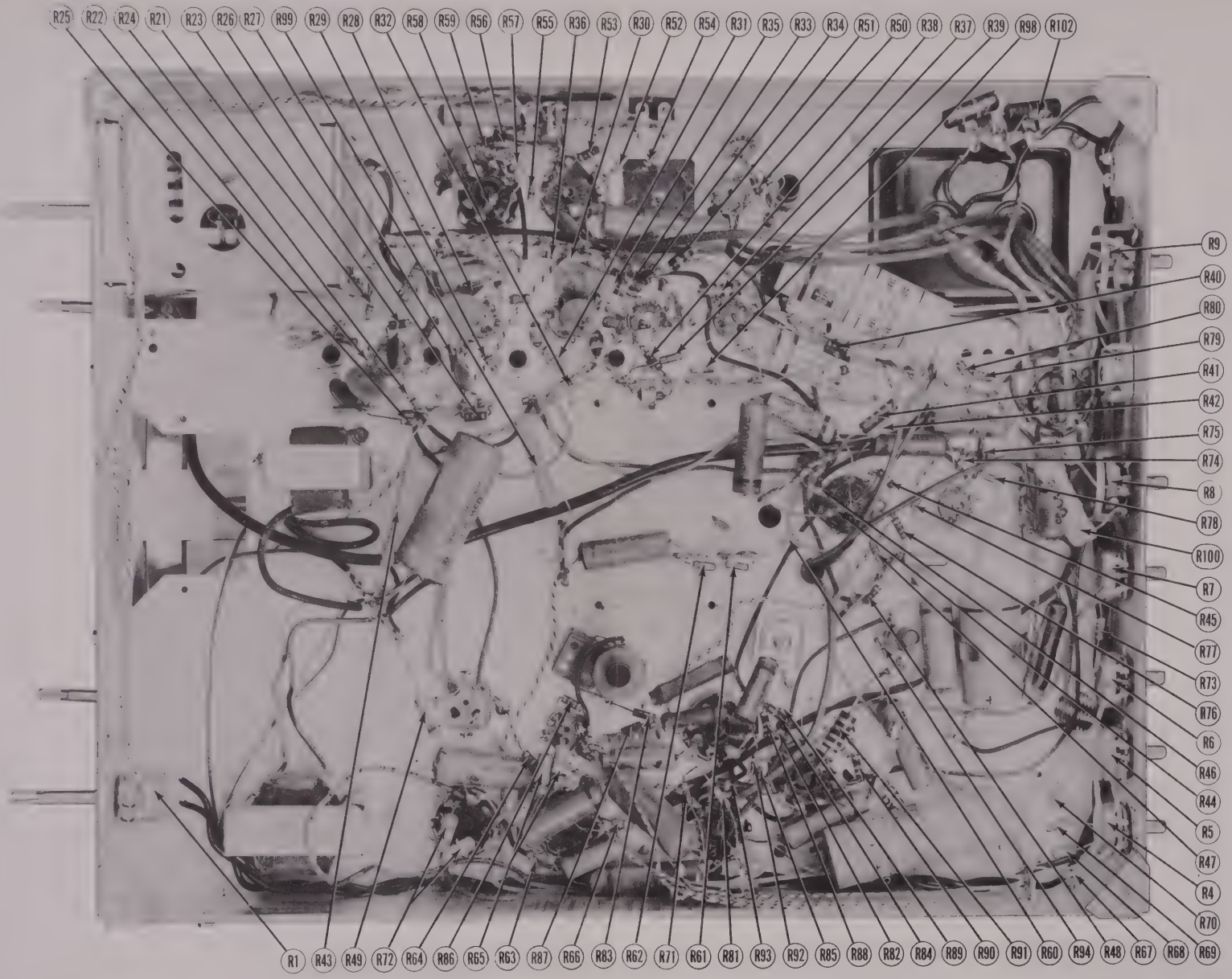
RF TUNER-RIGHT SIDE



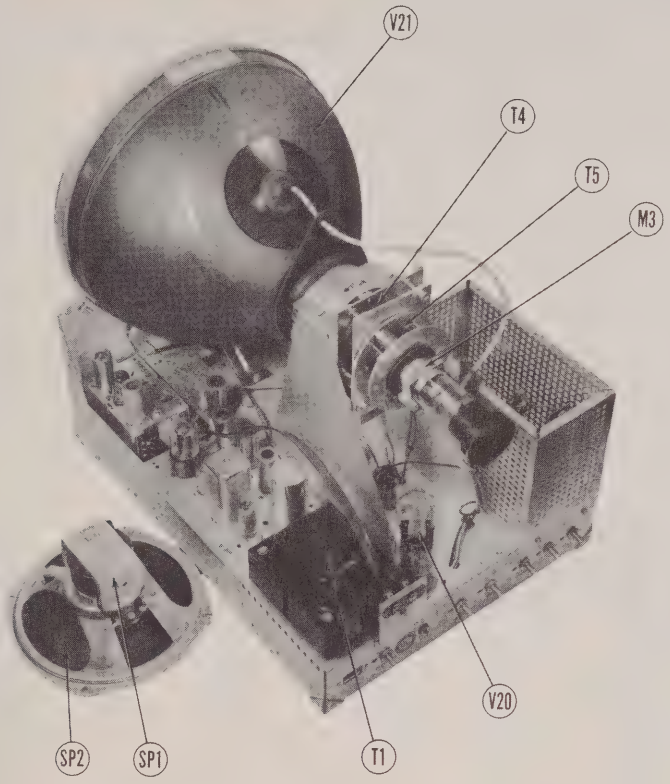
RF TUNER-LEFT SIDE



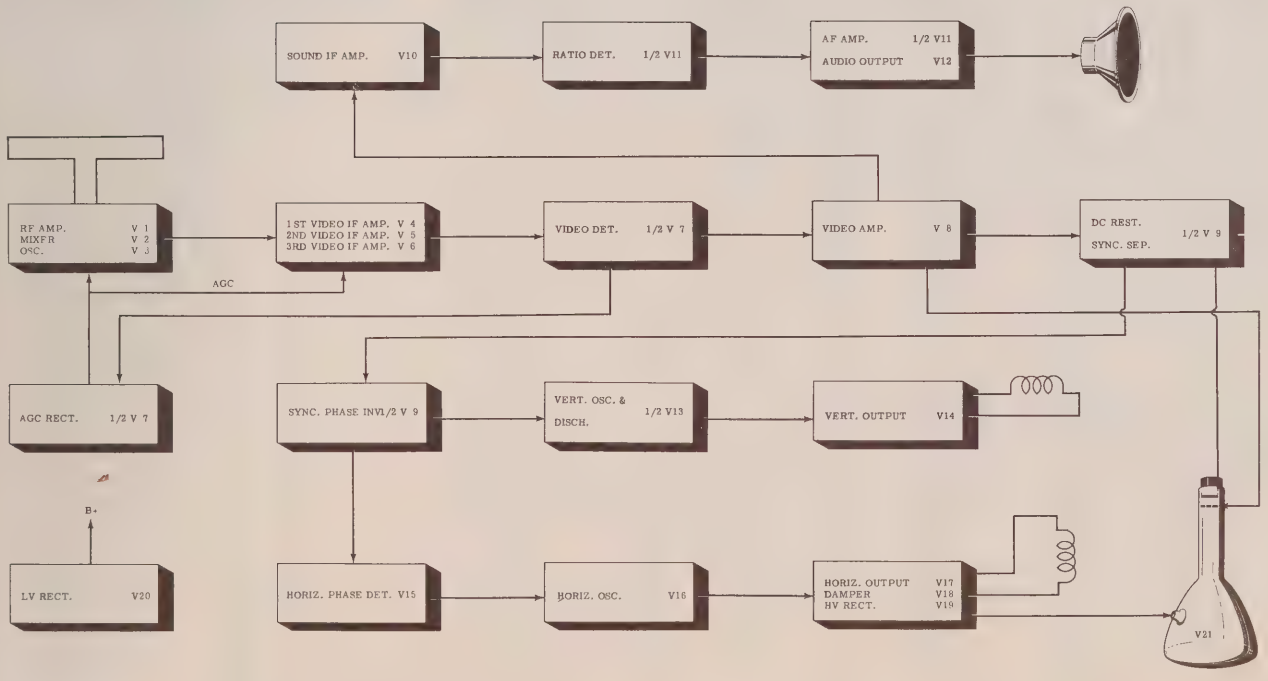
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CHASSIS-TOP VIEW



BLOCK DIAGRAM

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	6C4	6C4	6BG	
V4	1st Video IF	6AG5	6AG5	7BD	
V5	2nd Video IF	6AG5	6AG5	7BD	
V6	3rd Video IF	6AG5	6AG5	7BD	
V7	Video Det. -AGC	6AL5	6AL5	6BT	
V8	Video Amp.	6AU6	6AU6	7BK	
V9	DC Rest. -Sync. Sep. -Sync. Phase Inv.	12AU7	12AU7	9A	
V10	Sound IF	6AU6	6AU6	7BK	
V11	Ratio Det -AF Amp.	6T8	6T8	9E	
V12	Audio Output	6K6GT	6K6GT	7S	
V13	Vert Osc. -Vert. Disch.	6SN7GT	6SN7GT	8BD	
V14	Vert. Output	6K6GT	6K6GT	7S	
V15	Hor. Phase Det.	6AL5	6AL5	6BT	
V16	Hor. Osc.	6SN7GT	6SN7GT	8BD	
V17	Hor Output	6BQ6GT	6BQ6GT	6AM	
V18	Damper	6W4GT	6W4GT	4CG	
V19	HV Rect	1X2	1X2	7CB	
V20	LV Rect	5U4G	5U4G	5T	
V21A	Picture Tube	12LP4	12LP4	12D	Used in 413, 415 Series
B	Picture Tube	12KP4	12KP4	12D	Used in 413, 415 Series
C	Picture Tube	10BP4	10BP4	12D	Used in 412 Series

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SENTINEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	60	450	25E36	AFH128J			TVL-206	▪ Filter
B	40	450						▲ Filter
C2	1000	5	25E52	PRS6/1000			TVA-1	Hor. Cent. Cont. Bypass §
C3	40	300	25E31	PRS450/40			TVA-24	Filter
C4A	40	450	25E44	AFH8J8D26B			TVL-57	▪ Filter
B	50	150						■ Filter
C	100	50						▲ Vert. Output Cath. Bypass
C5A	10	450	25E38	AF33J			TVL-209	■ Filter
B	15	450						▲ Filter
C6	40	450	25E47	PRS450/40			TVA-24	Filter
C7	100	10	25E12	PRS12/100			UHC-112	V. Amp. Cath. Bypass
C8	10	25	25E8	PRS25/10			TVA-5	Stabilizing Cap.
C9	25			GP25K	D6-250	GP1K-25		RF Coupling
C10	680			GP680M	D6-681	GP2K-680		AGC Filter
C11	680			GP680M	D6-681	GP2K-680		RF Screen Bypass
C12	680			GP680M	D6-681	GP2K-680		RF Fil. Bypass
C13	25			GP25K	D6-250	GP1K-25		RF Coupling
C14	.25							RF Coupling
C15	.5				D2-.5			RF Coupling
C16	1.5			CN1.5CNPO	D2-1.5	NPOK-1.5		RF Coupling
C17	15			GP15K	D6-150	GP1K-15		RF Coupling
C18	5000			BPD-5		811-005	29C1	Mixer Screen Bypass
C19	680			GP680M	D6-681	GP2K-680		RF Bypass
C20	1.5			CN1.5CNPO	D2-1.5	NPOK-1.5		Osc. Coupling
C21	3			CN3DN150		N150K-3		Fixed Trimmer
C22	680			GP680M	D6-681	GP2K-680		Osc. Feedback
C23	680			GP680M	D6-681	GP2K-680		Osc. Fil. Bypass
C24	680			GP680M	D6-681	GP2K-680		RF Bypass
C25	100		23E2027-2	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C26A	4000		23E2037	BPD-5	D6-472	882-2 x 004	36C2	Mixer Plate Decoupling
B	4000			BPD-5	D6-472			1st V. IF Decoupling
C27	5000		23E2025	BPD-5	D6-502	811-005	29C1	1st V. IF Fil. Bypass
C28	5000		23E2025	BPD-5	D6-502	811-005	29C1	AGC Filter
C29	100		23E2027-2	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C30	5000		23E2025	BPD-5	D6-502	811-005	29C1	AGC Filter
C31	1.0	200	23E226	484-1.0			TC-10	AGC Filter
C32A	4000		23E2037	BPD-5	D6-472	882-2 x 004	36C2	2nd V. IF Decoupling
B	4000			BPD-5	D6-472			2nd V. IF Fil. Bypass
C33	100		23E2027-2	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C34A	4000		23E2037	BPD-5	D6-472	882-2 x 004	36C2	3rd V. IF Cath. Bypass
B	4000			BPD-5	D6-472			3rd V. IF Fil. Bypass
C35A	4000		23E2037	BPD-5	D6-472	882-2 x 004	36C2	3rd V. IF Screen Bypass
B	4000			BPD-5	D6-472			3rd V. IF Plate Decoupling
C36	100		23E2027-2	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C37	10		23E15	GP10M	D6-100	GP1K-10	MS-41	IF Coupling
C38A	4000		23E2037	BPD-5	D6-472	882-2 x 004	36C2	V. DET-AGC Fil. Bypass
B	4000			BPD-5	D6-472			DAGC Decoupling
C39	5		23E28	GP5K	D2-4.7	NPOK-5	MS-55	V. Diode Filter
C40	5		23E28	GP5K	D2-4.7	NPOK-5	MS-55	Freq. Comp. †
C41	.1	400	23E418	P488-1			TM-1	Video Coupling
C42	.05	200	23E216	P288-05			TM-15	Pic. Tube Cath. Bypass
C43	2		23E21	SI2CNPO	D2-2.2			S. IF Coupling
C44	3		23E13	CN3DN750				Fixed Trimmer
C45A	4000		23E2037	BPD-5	D6-472	882-2 x 004	36C2	S. IF Cathode Bypass
B	4000			BPD-5	D6-472			S. IF Decoupling
C46	1000		23E2012	GP1000M	D6-102	GP2L-001	1FM-21	Diode Load Cap.
C47	.002	200	23E205	P688-002	D6-202	GP2M-002	TM-22	De-emphasis
C48	.05	200	23E216	P288-05			TM-15	Audio Coupling
C49	.005	200	23E208	P688-005	D6-502	811-005	TM-25	Audio Coupling
C50	1000		23E2012	GP1000M	D6-102	GP2L-001	1FM-21	RF Bypass
C51	.02	400	23E413	P488-02			TM-12	Audio Coupling
C52	.05	400	23E416	P488-05			TM-15	Bias Filter
C53	5000		23E2025	BPD-5	D6-502	811-005	29C1	Output Plate Bypass
C54A	500		23E2037-3	GP500M	D6-501	GP2K-500	1FM-35	Integrator Net.
B	500			GP500M	D6-501	GP2K-500	1FM-35	Integrator Net.
C55	.05	600	23E416	P488-05			TM-15	Vert. Sync. Coupling
C56	.01	400	23E211	P488-01	D6-103	811-01	TM-11	Vert. MV Feedback
C57	.1	400	23E418	P488-1			TM-1	Vert. MV Feedback *
C58	.1	600	23E418	P668-1			TM-1	Vert. Discharge
C59	.2	400	23E420	P488-2			TC-3	Vert. Sweep Coupling

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SENTINEL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C60	1000		23E2012	GP1000M	D6-102	GP2L-001	1FM-21	Hor. Sync. Coupling
C61	1000		23E2012	GP1000M	D6-102	GP2L-001	1FM-21	Hor. Sync. Coupling
C62	.005	200	23E208	P688-005	D6-502	811-005	TM-25	AFC Filter
C63	.05	200	23E216	P288-05			TM-15	AFC Filter
C64	.05	600	23E616	P688-05			TM-15	Hor. Feedback
C65	.003	400	23E206	P688-003	D6-302	GP2M-003	TM-23	Voltage Divider
C66	.25	200	23E222	P488-25			TC-2	AFC Filter
C67	250		23E2030-3	GP250M	D6-251	GP2K-250	1FM-325	Hor. MV Feedback
C68	4000	500	23E86	1464-004			MS-24	Fixed Trimmer
C69	500		23E2030-9	GP500K	D6-501	GP2K-500	1FM-35	Hor. Discharge
C70	250		23E2030-3	GP250K	D6-251	GP2K-250	1FM-325	Hor. Discharge
C71	.001	600	23E604	P688-001	D6-102	GP2L-001	TM-21	Hor. Sweep Coupling
C72	.05	400	23E416	P488-05			TM-15	Hor. Output Screen Bypass
C73	.05	400	23E416	P488-05			TM-15	Damper Filter
C74	.1	400	23E418	P488-1			TM-1	Damper Filter
C75	500		23E2030-9	SI500JN750	DN-510		1FM-35	Fixed Padder
C76	500	10000	23E2029	HV500	TVL-501			HV Filter
C77	.01	400	23E2035-2	P488-01	D6-103	811-01	TM-11	Line Filter
C78	.01	400	23E2035-2	P488-01	D6-103	811-01	TM-11	Line Filter
C79	5000		23E2025	BPD-5	D6-502	811-005	29C1	Ratio Det.-AF Fil. Bypass
C80	.05	200	23E216	P288-05			TM-15	RF Bypass ‡

• Chassis stamped series "YA" uses .02MFD in this application. MFGR'S Part No. 23E413.
† Not used after chassis stamped "YC".
‡ Not used in all models.
§ Some models use 500MMF in this application. MFGR'S Part No. 25E49. Not used in series "YA" and "YB"

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	CLAROSTAT PART No.		INSTALLATION NOTES
R1A	500KΩ	½	28E55	Q13-133	AM-60-Z	BSK-60-S	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions
C	Switch		Not Req.	76-1	SW-A	Not Req.	Attach to R1A per instructions
R2A	35KΩ	½	28E56			AN-26	Brightness control
B	Shaft		Not Req.			AK-4	Attach to R2A per instructions
R3A	1000Ω	½	28E53	Q11-108	AM-8-S	AN-5	Contrast control
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Attach to R3A per instructions
R4A	500KΩ	½	28E37	Q11-133	M-58-S	AN-59	Vert. hold control-See note 1
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R4A per instructions
R5A	500KΩ	½	28E37	Q11-133	M-58-S	AN-59	Vert. size control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R5A per instructions
R6A	5000Ω	½	28E44	Q11-114	M-19-S	AN-10	Vert. linearity control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R6A per instructions
R7A	50KΩ	½	28E43	Q11-123	M-44-S	AN-31	Horiz. hold control
B	Shaft		Not Req.	Not Req.	Not Req.	AK-1	Attach to R7A per instructions
R8	5000Ω	2	28E57	W-5000	43-5000	V-135	Focus control-Wire Wound
R9	60Ω	2	28E54	43-60	43-60	V-117	Horiz. centering control-Wire Wound-See Note 2

Note 1. Series "YA" models use 1 Meg. control part No. 28E36.
Note 2. Some models use 30Ω control with same Part No. as above. Replace with 60Ω control.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R10	1000Ω 20%	½		BTS-1000	RF Grid
R11	33KΩ	½			RF Screen
R12	10KΩ	1			RF Plate
R13	18KΩ	½		BTS-18K	RF Plate Coil Shunt
R14	4700Ω	½		BTS-4700	Mixer Grid Coil Shunt
R15	82KΩ	½			Mixer Grid
R16	1 Meg. 20%	½			Mixer Grid
R17	82KΩ	½			Mixer Screen
R18	6800Ω 20%	1			Osc. Plate
R19	22KΩ 20%	½			Osc. Grid
R20	470Ω 20%	½			Osc. Cathode
R21	1000Ω	½	27E102-2	BTS-1000	Decoupling
R22	6800Ω 5%	½	27E682-2		1st Video IF Grid
R23	10Ω	½	27E100-2		1st Video IF Cathode-See Note 3
R24	1000Ω	½	27E102-2	BTS-1000	1st Video IF Decoupling
R25	330Ω	½	27E331-2		AGC Network
R26	330Ω	½	27E331-2		AGC Network
R27	6800Ω 5%	½	27E682-2		2nd Video IF Grid
R28	10Ω	1	27E101-2		2nd Video IF Cathode-See Note 3
R29	1000Ω	½	27E102-2	BTS-1000	2nd Video IF Decoupling
R30	100Ω	½	27E101-2		3rd Video IF Cathode
R31	1000Ω	½	27E102-2	BTS-1000	3rd Video IF Screen
R32	1000Ω	½	27E102-2	BTS-1000	3rd Video IF Plate Decoupling
R33	2.2Ω	½	27E1015-2	BW-½-2.2	Video Det. Diode Filament-Wire Wound
R34	330KΩ	½	27E334-2	BTS-330K	AGC Rect. Diode Load-See Note 4
R35	220KΩ	1	27E224-2	BTA-220K	AGC Network-See Note 5
R36	1000Ω	½	27E102-2	BTS-1000	AGC Network
R37	39KΩ	1	27E393-3	BTA-39K	Delayed AGC Network
R38	8200Ω 5%	½	27E1009-15	BTS-8200-5%	Video Det. Diode Load
R39	100Ω	½	27E101-2		Parasitic Supp.
R40	1000Ω	½	27E102-2	BTS-1000	Video Amp. Cathode
R41	6800Ω 5%	1	27E1009-14	BTA-6800-5%	Video Amp. Plate
R42	47KΩ	½	27E473-2	BTS-47K	Video Amp. Plate-See Note 6
R43	5000Ω	5	27E1016-4	AB-5000	Bleeder-Wire Wound-See Note 7
R44	220Ω	½	27E222-2	BTS-2200	Picture Tube Grid
R45	270KΩ 20%	½	27E274-2	BTS-270K	DC Rest. Load
R46	820KΩ	½	27E1009-21	BTS-820K	Sync. Sep. Plate
R47	4700Ω	½	27E472-2	BTS-4700	Sync. Phase Inv. Plate
R48	2200Ω	½	27E222-2	BTS-2200	Sync. Phase Inv. Plate
R49	68KΩ	1	27E683-3	BTA-68K	Voltage Divider-See Note 8
R50	270Ω	½	27E271-2		Sound IF Cathode-See Note 9
R51	33KΩ	1	27E333-2		Sound IF Decoupling
R52	6800Ω	½	27E682-2	BTS-6800	Ratio Det. Diode Load
R53	6800Ω	½	27E682-2	BTS-6800	Ratio Det. Diode Load
R54	39KΩ	½	27E393-2	BTS-39K	De-emphasis

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	IDENTIFICATION CODES
R55	10 Meg. 20%	½	27E106-2	BTS-10 Meg.	AF Amp. Grid
R56	220KΩ 5%	½	27E224-2	BTS-220K-5%	AF Amp. Plate
R57	220KΩ 20%	½	27E224-2	BTS-220K	Output Grid
R58	180KΩ 5%	½	27E1009-20	BTS-180K-5%	Voltage Divider
R59	330KΩ 5%	½	27E1009-9	BTS-330K-5%	Voltage Divider
R60	47KΩ	½	27E473-2	BTS-47K	Integrator Network
R61	47KΩ	½	27E473-2	BTS-47K	Integrator Network
R62	68KΩ	½	27E683-2	BTS-68K	Integrator Network
R63	10KΩ	½	27E103-2	BTS-10K	Vert. MV Grid-See Note 10
R64	470Ω	½	27E471-2	BTS-470	Vert. MV Cathode
R65	47KΩ	½	27E473-5	BT-2-47K	Vert. MV Plate-See Note 11
R66	470KΩ	½	27E474-2	BTS-470K	Vert. MV Plate
R67	100KΩ 20%	½	27E104-2	BTS-100K	Vert. MV Grid-See Note 12
R68	22KΩ	½	27E223-2	BTS-22K	Voltage Divider
R69	150KΩ 20%	½	27E154-2	BTS-150K	Voltage Divider
R70	220KΩ	½	27E224-2	BTS-220K	Voltage Divider-See Note 13
R71	2700Ω	½	27E272-2	BTS-2700	Vert. Peaking
R72	4.7 Meg.	1	27E475-2	BTA-4.7 Meg.	Vert. Output Grid-See Note 14
R73	2200Ω	½	27E222-2	BTS-2200	Vert. Output Cathode
R74	100KΩ 5%	½	27E1009-27	BTS-100K-5%	Horiz. Phase Det. Load
R75	100KΩ 5%	½	27E1009-27	BTS-100K-5%	Horiz. Phase Det. Load
R76	2200Ω	½	27E222-2	BTS-2200	Sync. Phase Inv. Cathode
R77	27KΩ	½	27E273-2	BTS-27K	Feedback Network
R78	4700Ω	½	27E472-2	BTS-4700	Feedback Network
R79	470KΩ 20%	½	27E474-2	BTS-470K	Horiz. AFC Filter Network
R80	470KΩ 20%	½	27E474-2	BTS-470K	Horiz. Phase Det. Load
R81	33KΩ	½	27E333-2	BTS-33K	Horiz. AFC Filter Network
R82	1500Ω	½	27E152-2	BTS-1500	Horiz. Osc. Cathode
R83	5600Ω 5%	½	27E1009-8	BTS-5600-5%	Horiz. Osc. Plate
R84	100KΩ 20%	½	27E104-2	BTS-100K	Horiz. Osc. Grid
R85	330KΩ 5%	½	27E1009-2	BTS-330K-5%	Horiz. Osc. Plate
R86	2200Ω	½	27E222-2	BTS-2200	Filter
R87	10KΩ	½	27E103-2	BTS-10K	Horiz. Peaking
R88	47Ω	½	27E470-2		Parasitic Supp.
R89	470KΩ 20%	½	27E474-2	BTS-470K	Horiz. Output Grid
R90	47Ω	½	27E470-2	BW-½-47	Horiz. Output Cathode
R91	47KΩ	2	27E473-5	BT-2-47K	Horiz. Output Screen-See Note 8
R92	100Ω	½	27E101-2		Parasitic Supp.
R93	1800Ω	1	27E182-3	BW-1-1800	Filter
R94	4700Ω	½	27E472-2	BTS-4700	Horiz. Linearity Coil Shunt
R95	3.3Ω		27E1015-4		HV Rect. Filament-Wire Wound
R96	680KΩ	½	27E684-2		HV Filter
R97	470KΩ	½	27E474		HV Filter
R98	220KΩ 5%	½	27E224-2	BTS-220K-5%	Voltage Divider
R99	1000Ω	5	27E1016-7	AB-1000	Series Focus Control-Wire Wound-See Note 15
R100	3000Ω	5	27E1016-8	AB-3000	Focus Coil Shunt-Wire Wound-See Note 16
R101	10KΩ	10	27E1016-9	AB-10,000	Bleeder-Wire Wound-See Note 17
R102	330KΩ 20%	½	27E1009-2	BTS-330K	Line Filter

Note 3. Chassis stamped series YA, YB or YC use 47Ω resistor in this application.
Note 4. Chassis stamped series YA, YB or YC use 680KΩ resistor in this application.
Note 5. Chassis stamped series YA, YB or YC use 470KΩ resistor in this application.
Note 6. Not used in chassis stamped series YA, YB or YC.
Note 7. Chassis earlier than series "YD" use 6000Ω, 5 watt resistor in this application.
Note 8. Chassis stamped series "A" and "B" use 10KΩ resistor in this application.
Note 9. Chassis earlier than series YD use 180Ω, resistor in this application.
Note 10. Chassis stamped series A use 22KΩ resistor in this application.
Note 11. Some models use two resistor in parallel to obtain required resistance and wattage.
Note 12. Chassis stamped series A use 470KΩ resistor in this application, and those chassis before series "YE" use 220KΩ resistor.
Note 13. Some models use 180KΩ resistor in this application.
Note 14. Some models use two resistors in series.
Note 15. Chassis before later production of series YD and YE use 2000Ω, 5 watt resistor in this application.
Note 16. Not used in chassis before series YD and YE. Chassis stamped series YD, late production, and series YE use 1500Ω, 5 watt resistor in this application.
Note 17. Used only in later production of chassis stamped series YD and YE.

SPEAKER

ITEM No.	RATINGS: FIELD RES.	RATINGS: V. C. IMP.	REPLACEMENT DATA: SENTINEL PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1A	100Ω	4.2Ω	1E41		8E100S	
B			1E39			
	CONE DIA.	V. C. DIA.				
SP2A	7 1/4"	9/16"				
B	4 x 6"	9/16"				

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: SENTINEL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC ② 1.7A	700VCT .200ADC	5VAC ③ 3A	6.3VAC ④ 1.2A SEC. 4 6.3VAC ② 6A SEC. 5 6.3VAC ④ 1.2A	22E43	P-8159 ① P-6134 ②	P-3066	TP-405 ① FO-6 ②

① Drill new mounting holes.
② Mount under chassis and use for SEC. #5.

SENTINEL MODELS 412, 413, 414, 415

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	DC RESISTANCE		SENTINEL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.					
T2	300Ω Tap ⓐ 45Ω	4.5Ω Tap ⓐ .4Ω SEC. 2 0Ω	22E44	A-8118	HVO-6		Hor. Output Trans.
T3	1200Ω	9.5Ω	22E39	A-8112	A-3036	TSO-5 ③	Vert. Output Trans.
T4A	11Ω		30E141-3	DY-1	MD-3		Hor. Deflection Coil
B	62Ω						Vert. Deflection Coil
T5A	3.1KΩ		2E104 ④				Focus Coil
B			2E93 ⑤				Focus Coil

③ Drill one new mounting hole.
④ Used in series "YF" and later.
⑤ Used in series "YA" to and including "YE".

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SENTINEL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T6	6.4KΩ	4.2Ω	435Ω	.7Ω	22E35-2	A-3878	A-2931	RO-13	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	SENTINEL PART No.	MEISSNER PART No.	
L1	Ant. Trans.	.3Ω	.1Ω			Part of tuner, Part No. 20E519
L2	Fil. Choke	0Ω				Part of tuner, Part No. 20E519
L3	Fil. Choke	0Ω				Part of tuner, Part No. 20E519
L4	Fil. Choke	.2Ω		2E78		
L5	1st Video IF	.4Ω		20E360		
L6	Fil. Choke	1Ω		2E92		
L7	2nd Video IF	.4Ω		20E360		
L8	Fil. Choke	1Ω		2E92		
L9	3rd Video IF	.4Ω		20E360		
L10	3rd Video IF Grid	4.1Ω		2E363-9		Wound on 4700Ω resistor
L11	Fil. Choke	1Ω		2E92		
L12	RF Choke	4.3Ω		20E363-8		
L13	4th Video IF	.4Ω		20E360		
L14	Peaking	9.1Ω		20E363-2		Wound on 33KΩ resistor
L15	Peaking	26.5Ω		20E363-6		Wound on 10 Meg. resistor
L16	Peaking	14Ω		20E363-3		Wound on 15KΩ resistor
L17A	Peaking	18.8Ω		20E363-10		Wound on 1 Meg. (Beginning with series YD)
B	Peaking			20E363-7		Wound on 22KΩ resistor
L18	Sound IF	3.2Ω		20E361		Tap at 2.1Ω
L19	Ratio Det. Trans.	4Ω	.9Ω	20E537		
L20	Horiz. Freq.	64Ω		20E409		
L21	Horiz. Lin.	16.1Ω		20E524		
L22A	Width Coil	.4Ω		2E98-2		Wound on 1 Meg. resistor
B	Width Coil			2E98		

MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
M1	RF Tuner	20E519	
M2	Fuse	40E7	.25A 250V SLO-BLO
M3	Ion Trap	15E122	
M4	Trimmer	24E16-2	Width 130-300MMF
M5	Trimmer	24E16-2	Horiz. Drive 130-300MMF
M6	Trimmer	30E154	Antenna trimmer with 9" shaft assembled to trimmer
	Knob	20E544-2	Channel selector model 412
	Knob	20E544	Channel selector models 413 and 415
	Knob	37E59-3	Channel selector model 412 less metal plate
	Knob	37E59	Channel selector models 413 and 415 less metal plate
	Knob	20E545-2	Off-On-Volume model 412
	Knob	20E545	Off-On-Volume models 413 and 415
	Knob	37E59-4	Off-On-Volume model 412 less metal plate
	Knob	37E59-2	Off-On-Volume models 413 and 415 less metal plate
	Knob	37E56-6	Brightness, Contrast, Model 412
	Knob	37E56-5	Brightness, contrast Models 413 and 415
	Knob	37E61	Antenna tuning model 412
	Knob	27E62	Antenna tuning models 413 and 415
	Antenna Assembly	20E550	
	Safety Glass	9E30	Model 412
	Safety Glass	9E28	Model 413
	Safety Glass	9E28-2	Model 414
	Safety Glass	9E31	Model 415

WEBSTER
MODEL 346

WEBSTER
MODEL 346

Figure 1

GENERAL INFORMATION

The Webster-Chicago Model 346 is a three-speed, single-post, automatic record changer. It is designed to play automatically up to a 1-inch stack of 7-inch, 10-inch or 12-inch records at speeds of 33-1/3, 45 or 78 RPM.

The pickup arm will return to the rest position after playing the last 10-inch or 12-inch record, although the motor continues to revolve until the "Speed-Selector Lever" is turned to the nearest "Off" position. Two "Off" positions are provided for ease of operation. The idler wheel is pulled away from the drive wheels and the drive wheels are also retracted from the motor shaft when the speed-control lever is in an "Off" position. This eliminates the possibility of a flat spot developing on the rubber surfaces.

The last 7-inch record of a stack continues to play until the changer is turned to "Off" position. The tone arm is moved manually to the rest position.

Manual operation is provided for playing non-standard home recordings or "inside-cut" records up to 12 inches in size.

Manufactured by
Webster-Chicago Corporation
5610 Bloomingdale Avenue - Chicago 39, Illinois

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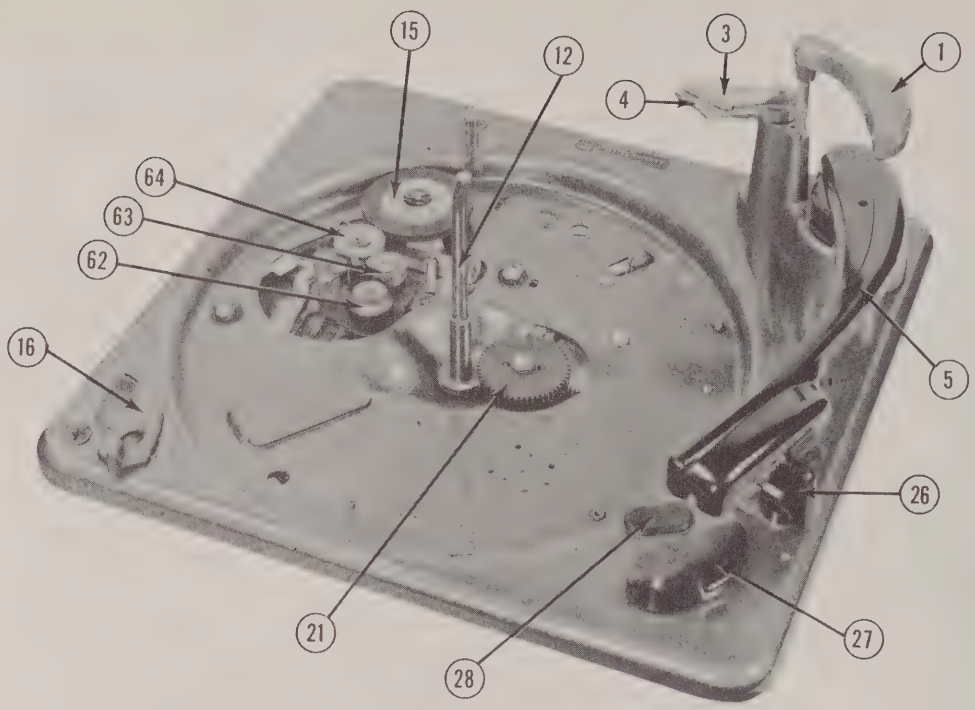


Figure 2

AUTOMATIC OPERATION

1. Raise the record weight (1) and rotate it outward until the pin in the shaft drops into the locating groove.

2. Push the record shelf (4) forward to its location for 10-inch records, or backward for 12-inch records. For 7-inch records, move the record shelf (4) as for playing 10-inch records. Place the 7-inch record shelf (3A) in position with 7-inch selector knob (3C) turned to "45" or "33", as required. If 7-inch records are to be played, move the pickup arm to the spindle (12), then raise the 7-inch arm rest (25) to its vertical position. The pickup arm (5) must then be moved back to the 7-inch rest position. For 10-inch and 12-inch records, this arm rest (25) should be left in its horizontal position.

3. Pivot the cartridge (6) to "Std." for all 78 RPM standard groove records, and to "Micro" for 33-1/3 RPM and 45 RPM records.

4. Place up to a 1-inch stack of records on the spindle so that the bottom records rests on the spindle step and the record shelf.

5. Turn the ballast weight (1) in, and lower it to the records.

6. Move the speed-control lever to "33-1/3", "45" or "78", depending on type of record to be played. This also turns the motor on.

7. Move the control knob (27) to the "Reject" position and release. This starts the automatic operation of the changer, which will play the entire stack of records, and upon completion of the last 10-inch or 12-inch record, the pickup arm will be returned to a rest position. However, the motor will continue to revolve until the speed-control lever (16) is turned to the nearest "Off" position. The last 7-inch record will continue playing until the pickup arm is placed on the 7-inch rest (25) and the speed-control lever (16) moved to the "Off" position.

8. Any record may be rejected, while playing, by moving the "Reject-Manual" lever (27) to "Reject" and releasing.

To Remove Records from Turntable:

1. Be sure the pickup arm is on the arm rest.

2. Lift and turn the ballast weight (1) out of position.

3. Lift the stack of records straight up the spindle, following the contours of the spindle.

MANUAL OPERATION

1. Raise the record ballast weight (1) and move it outward until the pin in the shaft drops into the locating groove.

2. Turn the record shelf (4) to the 12-inch position. This is to provide more clearance in loading and unloading records.

3. Place the record to be played on the turntable.

4. Move the cartridge-selector lever to "Std." or "Micro", as required.

5. Move the "Reject-Manual" lever (27) to the "Manual" position.

6. Move the speed-selector lever (16) to the proper setting, depending on the type of record to be played - "78", "45", or "33-1/3" RPM. This starts the motor.

7. Place the needle gently on the edge of the record.

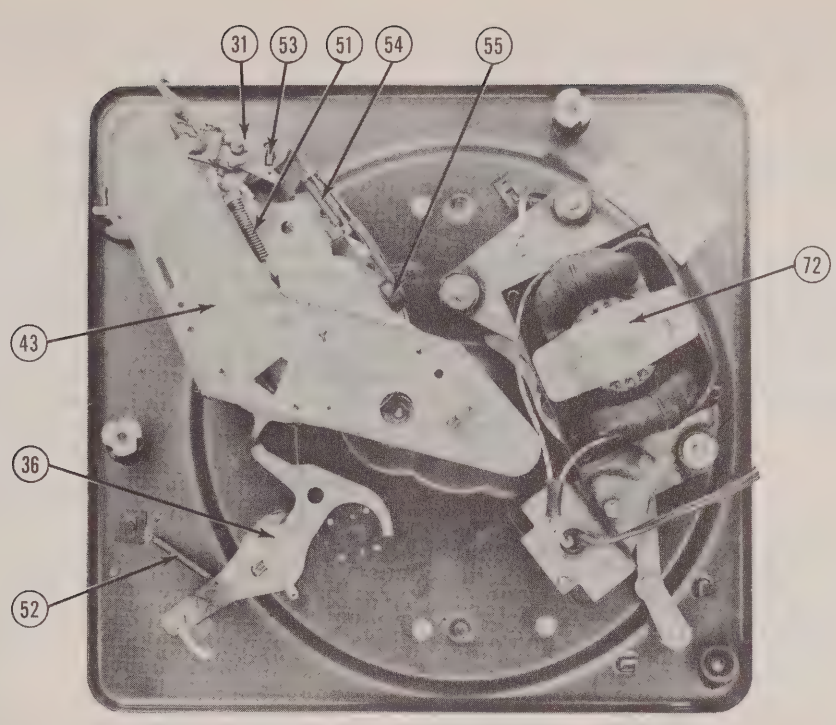


Figure 3

8. Upon completion of the record, place the pickup arm on the arm rest (26) and move the speed-selector lever to the nearest "Off" position.

CHANGE CYCLE

As the pickup arm moves toward the center of the record, it carries the automatic trip arm (32) with it through the frictional condition set up by the clutch weight (29). This holds the trip arm against the raising disc (35), which is fastened to the hinge shaft (10), as the trip arm gradually approaches the velocity trip lever (37) and, upon contact, carries it with it; however, the main cam actuating gear (38) has four equally spaced projections on its circumference, which strike the velocity trip roller (37A) as the gear revolves. This forces the automatic trip arm (32) and the velocity trip (37) away from the tripping point. This does not affect the pickup arm because of the friction clutch. When the needle enters the eccentric groove of the record, the automatic trip arm (32) moves at such speed that it carries the velocity trip lever (37) to the tripping point between projections on the main gear. This releases the actuating pawl on the main cam assembly (39), allowing it to engage the main cam actuating gear (38) which, in turn, drives the cam (39) through the change cycle.

The main cam (39) has two cam surfaces on its lower side. The inside cam surface forms a track in which the stud of the pickup raising lever (41) rides. The outer cam surface actuates the cam lever (55) by means of the cam lever roller. As the cam rotates, the pickup arm raising lever (41) pushes up on the raising disc (35), raising the pickup arm from the record. The stud of the raising lever is now moved toward the center of the cam. As the raising lever moves, it engages a notch in the raising disc (35), moving the pickup arm out clear of the record stack. As the cam continues to rotate, the roller of the cam lever (55) moves up the incline of the cam, causing the arm of the lever to engage and actuate the push-off blade finger (33); this, in turn, rotates the push-off blade (3) toward the spindle to drop a record.

The stud on the raising lever now moves away from the center of the cam, thereby moving the pickup arm in to the set-down position. This position is determined by the selector-lever compression spring (51). When the record shelf (3) is turned to the 10-inch position, pressure is applied, by this spring, to cause the raising lever stud (41) to follow the outer edge of its groove in the main cam. With the record shelf (4) in the 12-inch position, the spring is released and the stud follows the inner edge of its groove. The stud now moves up an incline, allowing the pickup arm to set down on the record.

At the same time, the roller on the cam lever moves back up its incline, returning the push-off blade to its normal position.

During the rotation of the cam, the velocity trip lever (37) has been reset by the projection on the main gear (38); therefore, when the cam has completed one revolution, the hook on the velocity trip lever catches the cam pawl and disengages the main cam (38) from the cam actuating gear. The roller of the cam lever (55) now drops into a detent in the outer cam track which holds the main cam (38) in a stationary position, thus completing the change cycle.

ADJUSTMENTS

Pickup Arm Height:

The vertical movement of the pickup arm is controlled by the angle of the pickup arm raising lever (41).

To make the Adjustment:

1. Place a 1-inch stack of records on the turntable.

2. Trip the "Reject" control (27) and rotate the turntable clockwise until the needle clears the top record of the stack by about 1/16 inch.

3. Be sure the front or 10-inch notch in the pickup arm raising disc engages the pickup arm raising lever.

4. If the needle does not clear the top record, or if it raises too high, adjust by holding the pickup arm raising lever (41) at point "X" and bending a "Y", as indicated (in exploded view).

CAUTION: Bend slowly, as only a slight change in angle is required.

Set-Down Adjustment:

Normally, the set-down point may be adjusted by turning the eccentric pin (7A) in the hinge assembly (7). This pin is turned with a screwdriver and is reached through a hole in the top of the pickup arm (see Figure 2). By turning the screw clockwise, the set-down point is moved toward the spindle, and counterclockwise, the needle is moved away from the spindle; however, should this adjustment fail to correct the landing point of the needle, the following procedure is necessary to obtain correct landing:

1. Set the eccentric screw (7A) to a central position.

2. Set the record shelf (4) to the 10-inch position.

3. Trip the mechanism by moving the "Reject-Manual" control lever (27) to "Reject" and releasing. Rotate the turntable, by hand, clockwise until the needle drops to within 1/8 inch of a 10-inch record on the turntable.

4. Be sure the notch in the raising disc (35) engages the raising lever (41).

5. The No. 8 Bristol set screws in the raising disc (35) have pointed ends which fit into off-center holes in the pickup arm pivot (10). Loosen one screw and tighten the other until the needle rests above the lead-in groove of the record. Be sure both screws are tight when the adjustment is made.

6. Complete the change cycle of the mechanism and place the pickup arm on the arm rest (26). The tongue of the pickup arm raising disc (35) should now rest against the post which supports the sub-plate assembly. If the pickup arm does not rest in the proper position on the pickup arm rest, bend the tongue closer to, or away from, this post until the pickup arm is correctly positioned.

7. Turn the record shelf (4) to 12 inch, and check the set-down point on a twelve-inch record. Make any additional adjustments with the eccentric screw (7A).

8. For 7-inch set down, move the pickup arm to the center of the turntable, trip the mechanism and rotate the turntable, by hand, until the pickup arm moves about half-way out. Stop the rotation of the turntable; then move the pickup arm toward the center-post until the outside or 7-inch notch of the pickup arm raising disc (35) engages the pickup arm raising lever (41). Continue to rotate the turntable until the pickup arm reaches the end of its outward movement. Raise the 7-inch pickup arm rest (25) and bend it in, or out, until it just touches the side of the arm. This positions the pickup arm for 7-inch set down.

Automatic Trip Friction Clutch:

The automatic trip friction clutch is produced by the clutch weight (29) resting on the trip arm (32). This causes the automatic trip arm to follow the movement of the pickup arm. The trip arm (32) gradually approaches the velocity trip lever (37) and, upon contact, carries it with it; however, the main cam actuating gear (38) has four equally spaced projections on its circumference which strike the velocity trip lever roller as the gear revolves. This forces the velocity trip lever (37) and the automatic trip arm (32) away from the tripping point; however, when the movement of the pickup arm toward the spindle is greater than 1/8 inch in 1/2 revolution of the turntable, the automatic trip arm (32) pivots the velocity trip lever and roller assembly (37) in enough to release the actuating pawl on the main cam assembly (39), allowing it to engage the main gear (38), thus driving the cam (39) through the change cycle.

If the clutch does not cause the automatic trip arm to trip the mechanism, clean the parts with carbon tetrachloride. This clutch should operate the trip mechanism without placing undue drag on the movement of the pickup arm.

Erratic Indexing (Toggle Spring Adjustment):

Improper toggle spring (51) adjustment may cause erratic indexing of the pickup arm. Indexing, in either the 10-inch or 12-inch position, is controlled through the presence, or absence, of pressure from the compression spring (toggle) (51) on the pickup arm raising lever bracket (41), forcing the stud to travel either the inside edge or the outside edge of the groove in the bottom of the main cam (39).

When the record shelf (4) is in 12-inch position, compression spring (51) should be just free of the raising lever bracket (41), while in the 10-inch position, the compression of the spring holds the stud of the pickup arm raising lever (41) against the outside edge of the groove.

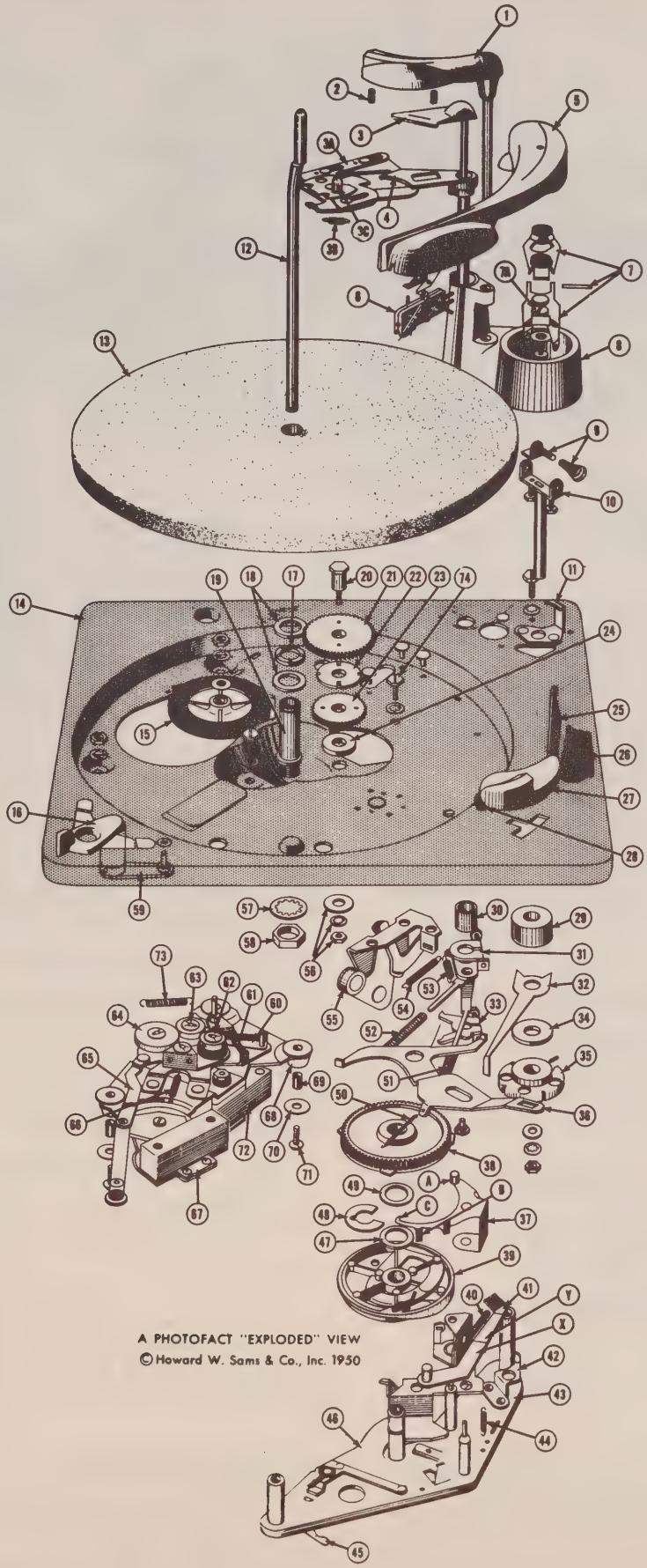
If the compression tension needs adjusting, bend the metal finger, through which the spring arm (51) fits, to give a "sloppy" fit of spring (51) when the record shelf (4) is in the 12-inch position.

Push-Off Blade Adjustment:

The record must leave the spindle step just prior to or, at least, by the time it leaves the record shelf. If the spindle is too far from the record shelf, the record will hang up on the spindle step and fail to drop.

To Adjust:

Using a rubber mallet, hit the part of the housing (8) hard enough to jar it nearer or farther away from the spindle. With a record on the spindle and record shelf (4), there should be about 1/16 inch clearance between the push-off blade (3) and the record.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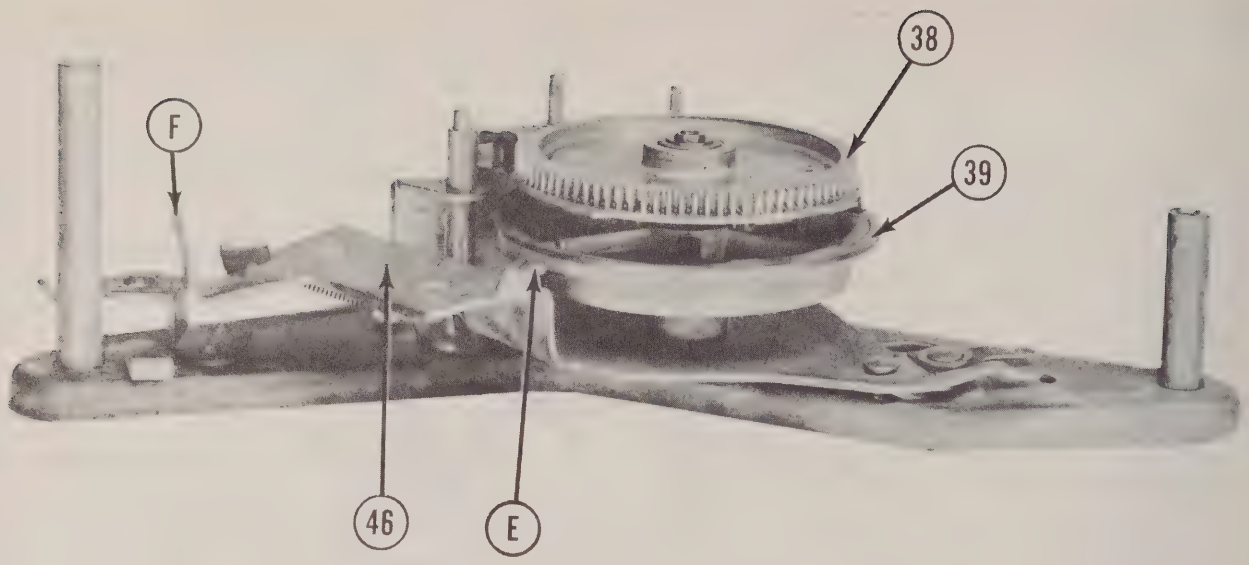

Figure 4

TROUBLES

Failure to Trip:

1. Grease or oil on the automatic trip friction clutch: Items 29, 32, 34, and 35:

(a) Clean parts with carbon tetrachloride.

2. Velocity trip and roller assembly (37) binding.

3. Trip pawl on main cam (39) binding.

4. Velocity trip and roller assembly (37) rubbing on the underside of the main cam actuating gear (39).

5. Automatic trip arm (32) bent and not hitting the velocity trip roller assembly (37).

Reject Trip Fails:

1. Trip wire on trip lever (36) bent or broken.

2. Velocity trip and roller assembly (37) binding.

3. Trip pawl on main gear (39) binding.

Continuous Tripping:

1. Roller on velocity trip assembly (37) missing, thereby not resetting trip (37).

2. Trip lever (32) binding.

3. Spring (50) loose or missing, thus allowing the trip lever (36) to stay in the "Reject" position.

4. Incorrect clearance between lip (B) on trip (37) and main cam (39):

(a) At the completion of the change cycle, the actuating pawl of the cam (39) is disengaged from the main cam actuating gear (38) by the hooked end (C) of the velocity trip lever (37) (see exploded view). If the clearance between lip (B) on the velocity trip lever (37) and the edge of the main cam (39), Figure 5, is too small, it will prevent the hooked end of the velocity trip lever from engaging the pawl. Adjust the clearance between the lip on the velocity trip lever (37) and the main cam (39) to be within 1/32 inch and 1/64 inch when the roller of the velocity trip lever is contacting one of the reset points on the actuating gear (38).

Records Fail to Drop:

1. Push-off blade (3) out of adjustment. See "Push-Off Blade Adjustment."

2. Spring (53) loose, thereby allowing the push-off blade (3) to remain in a forward position at all times.

3. Push-off blade finger (31) bent, resulting in its not being actuated by the cam lever assembly (55).

More Than One Record Drops at a Time:

1. Center hole in records too large.

2. Spindle slide not fully down. If the spindle slide is not all the way down, more than one record may drop at a time. Check the slide to see that it is free and does not bind at any point.

3. Exceptionally thin records.

Change Cycle Starts Before End of Record:

If the trip assembly (37) chatters while the changer is running, or if the changer cycles before the entire record is played, there is probably insufficient clearance between the hooked end of the velocity trip and roller assembly (37) and actuating gear (38). This clearance should be adjusted to be within 1/32 inch to 1/64 inch by bending the lever at point "D", as shown in Figure 5.

The Last Record Repeats:

The weight of the records on the spindle keeps the automatic shut-off lock lever (46) from dropping and engaging the pickup arm raising disc (35). The dropping of the last record releases the automatic shut-off lock lever: however, as the cam lever and

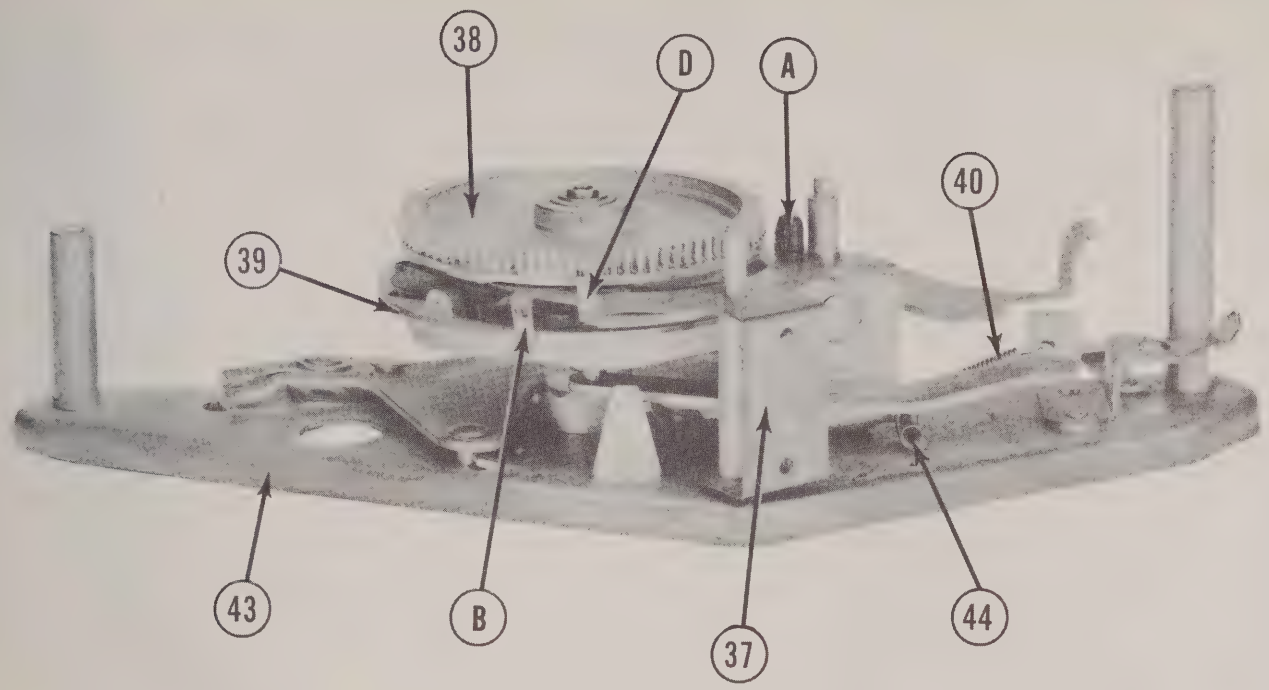

Figure 5

bracket assembly (55) moves forward to engage the push-off blade actuating lever (31), an ear on the cam lever (55) should also move forward, under point (E) of the automatic shut-off lock lever (46) figure 4, to make certain it does not drop until the last record has dropped to the turntable and the pickup arm is in position to play. Upon completion of the change cycle, the shut-off lever then drops down on the raising disc (35). When the last record has finished playing, the changer is tripped and the pickup arm moves out over its rest (26). The hooked end (F) of the shut-off lever (46), Figure 4, then engages the raising disc (35) preventing the pickup arm from moving onto the record. The pickup arm then comes to a rest on the rest (26).

If the Last Record Continues to Play:

(a) Check the spindle to be sure it moves up and down freely.

(b) With no records on the spindle, and with the changer out of cycle, the hook (F), Figure 4, of the automatic shut-off lever (46) should clear the top of the pickup arm raising disc (35) by 1/32 inch. Adjust, if necessary, by bending the automatic shut-off lock lever slightly.

Last Record Will Not Play:

1. Point (E) figure 4 of the automatic shut-off lever (46) not engaging the ear on the cam lever and bracket assembly (55) (see paragraph "The Last Record Repeats").

(a) To adjust, bend point (E) of the automatic shut-off lock lever (46), Figure 4, so the ear on the cam lever (55) and point (E) of the shut-off lever engage properly.

LUBRICATION

This changer has been lubricated at the factory, which should be sufficient for a long period of time; however, if operated under extreme conditions of dust or heat, the changer should be cleaned and lubricated as follows:

Use No. 10 Oil on the following:

1. Motor bearings.
2. Pickup arm shaft.
3. Ball bearing assembly (17).
4. Idler wheel felt.

Nonfluid Lubricant on the following:

1. Idler wheel link.
2. Turntable shaft stud.
3. Pickup arm hinge pins.
4. Knife edge of the pickup arm raising lever (41).
5. Main cam bearing. (It is necessary to remove the sub-plate assembly to lubricate this assembly).
6. Teeth of main cam actuating gear (38).
7. Track of main cam gear (39).
8. Teeth of large (21) and small (23) idler gears.
9. Raising lever bracket bearing surfaces.

CAUTION: Do not overlubricate. This may cause sticking of parts. Do not allow any oil or grease to come in contact with the rubber-drive idler wheel (15), or the motor sleeve on the turntable drive rim, or the automatic trip arm clutch: Items 32, 34 and 35. Any oil or grease on these points should be cleaned with carbon tetrachloride.

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	42X196	Record Weight Assembly	37	11X320	Velocity Trip
2	24P013	Record Weight Cushion	38	11X032	Trip Resetting Gear Assembly
3	42X183	Push-Off Blade			
3A		7" Record Shelf	39	11X033	Cam and Trigger Assembly
3B		7" Record Shelf Actuating Spring	40	46P044	Tension Spring
4	42X184	Record Shelf	41	11X046	Pickup Arm Raising Lever
5	49X123	Pickup Arm	42	45P347	Pickup Arm Pivot Bracket
6		Cartridge	43		Sub-Frame
7	21X283	Pickup Arm Hinge Assembly	44	46P139	Tension Spring
8	42P199	Housing	45	50P204	Spindle Retainer Clip
9	11X386	Pickup Arm Counterbalance Spring	46	11X316	Automatic Shut-Off Lock Lever
10	11X385	Pickup Arm Shaft	47		Flat Washer
11		Pickup Arm Left Stop Bracket	48		"C" Washer
12	11X358	Spindle	49		Flat Washer
13	11X292-C	Turntable	50	46P117	Tension Spring
14		Base Plate	51	46P152	Compression Spring
15	11X366	Idler Wheel	52	46P151	Compression Spring
	50P125	Spring Clip for Item (15)	53	46P162	Tension Spring
	25P030	Felt Washer for Item (15)	54	46P158	Tension Spring
	25P046	Fiber Washer for Item (15)	55	11X319	Cam Lever and Bracket Assembly
16	42X205	Speed Selector			
	41P669	Bushing	56		Flat Washer, Internal Tooth Lock Washer and Hex Nut (Part of Assembly 24)
17	11X058	Bearing Race			
18	25P269	Bearing Race Washer			
19	41P414	Turntable Bearing	57	25P333	Turntable Bearing Lock Washer
20	41P333	Shoulder Screw			
21	47P024	Large Idler Gear	58	26P687	Turntable Bearing Nut
22	45P342	Idler Gear Coupler	59	17X466	Hub and Lever Assembly
23	47P023	Small Idler Gear	60	45P817	Index Lock Lever
24		Brass Spacer	61		Index Lock Lever Tension Spring
	11X132	Complete Gear Assembly: Includes Items 20, 21, 22, 23, 24, and 56	62	11X456	Drive Wheel -33-1/3 RPM
			63	11X458	Drive Wheel - 45 RPM
			64	11X460	Drive Wheel - 78 RPM
25	11X481	7" Rest Assembly	65	17X464	Index Plate and Cam Assembly
26	49P099-C	Pickup Arm Rest			
27	49X089-C	"Reject-Manual" Lever			
28	24P004-C	Needle Pad	66	46P139	Tension Spring
29	41P576	Velocity Trip Clutch Weight	67	32P054	Switch and Bracket Assembly
30	41P607	Spacer		45P819	Switch Cover
31	11X287	Lever and Toggle Assembly	68	25P363	Motor Shock Mounts
32	45P568	Automatic Trip Arm	69	41P592	Motor Mount Sleeves
33	11X312	Push-Off Blade Actuating Lever	70	25P367	Motor Mount Washer
			71	26P110	Motor Mount Bolt
34	23P009	Friction Disc	72	17X467	Motor and Top Bridge Assembly
35	11X227	Pickup Arm Raising Disc			
36	11X291	Trip Lever and Wire Assembly	73	46P134	Idler Link Tension Spring
			74	41P333	Stud Mounting Screw

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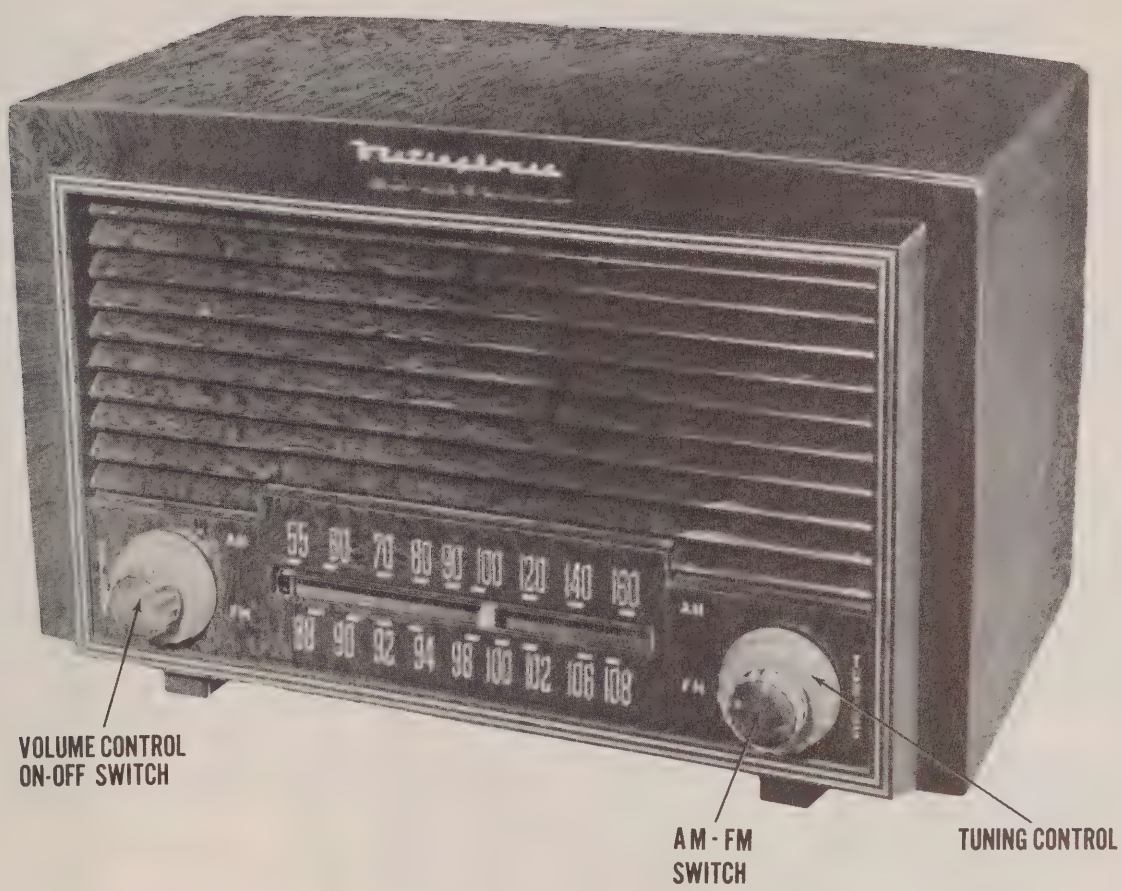

WESTINGHOUSE
MODELS H-307T7, H-308T7 (Ch. V-2136)

WESTINGHOUSE MODEL H307T7

TRADE NAME	Westinghouse, Models H307T7, H308T7 (Ch. V-2136)		
MANUFACTURER	Westinghouse Electric Corp., Receiver Div. Sunbury, Pa.		
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna		
TUBES (SEVEN)	Types 12AT7 FM RF Amp.-Mixer, 12BE6 FM Osc.-AM Conv., 12BA6 1st IF Amp., 6BJ6 FM 2nd IF Amp., 12AL5 Ratio Det., 12AV6 DET-AVC-AF, 50C5 Power Output		
POWER SUPPLY	110-120 Volts AC-DC	RATING	.33 Amp. at 117 Volts AC
TUNING RANGE-BROADCAST	540-1615KC	FREQ. MOD.	88-108MC

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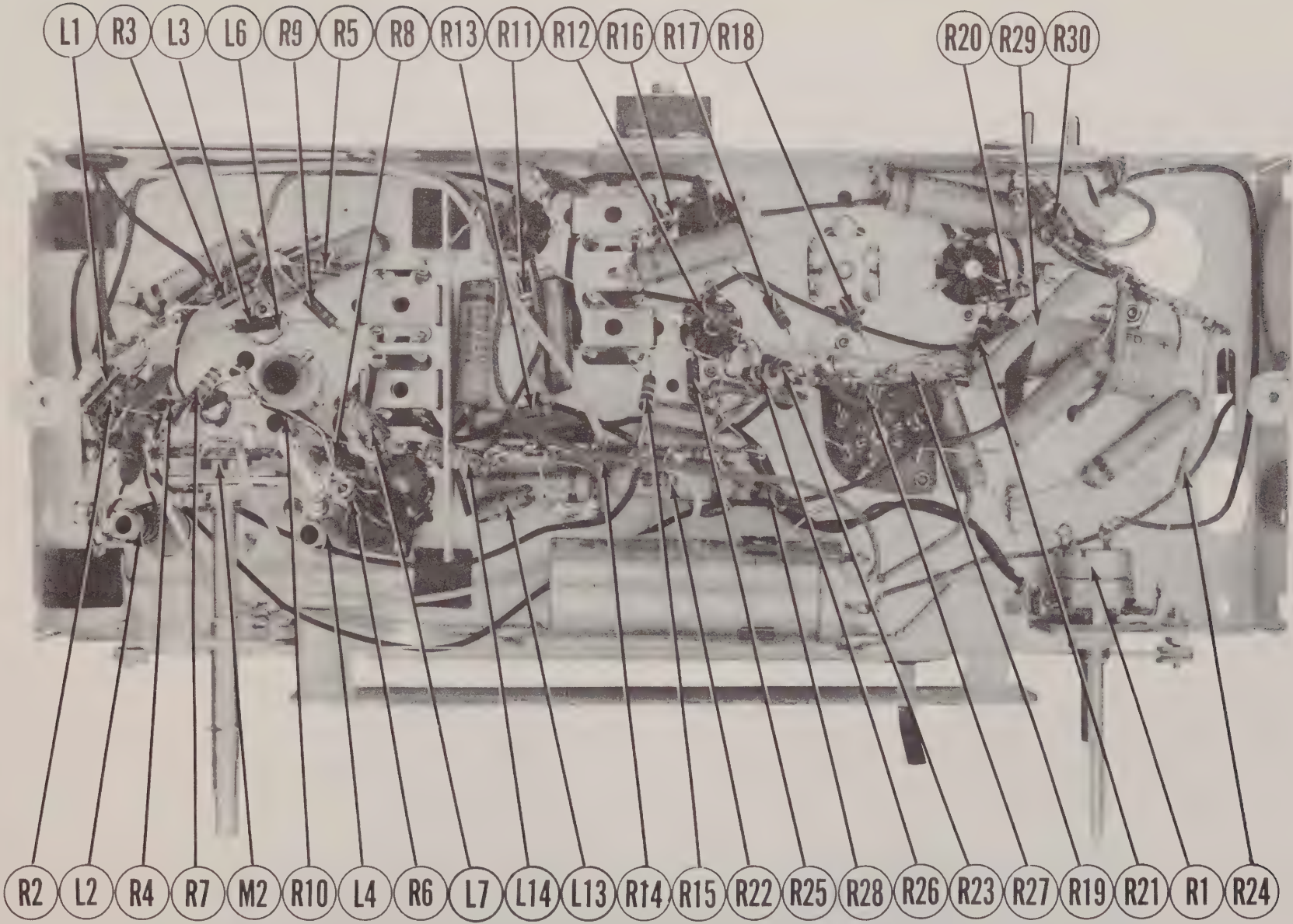
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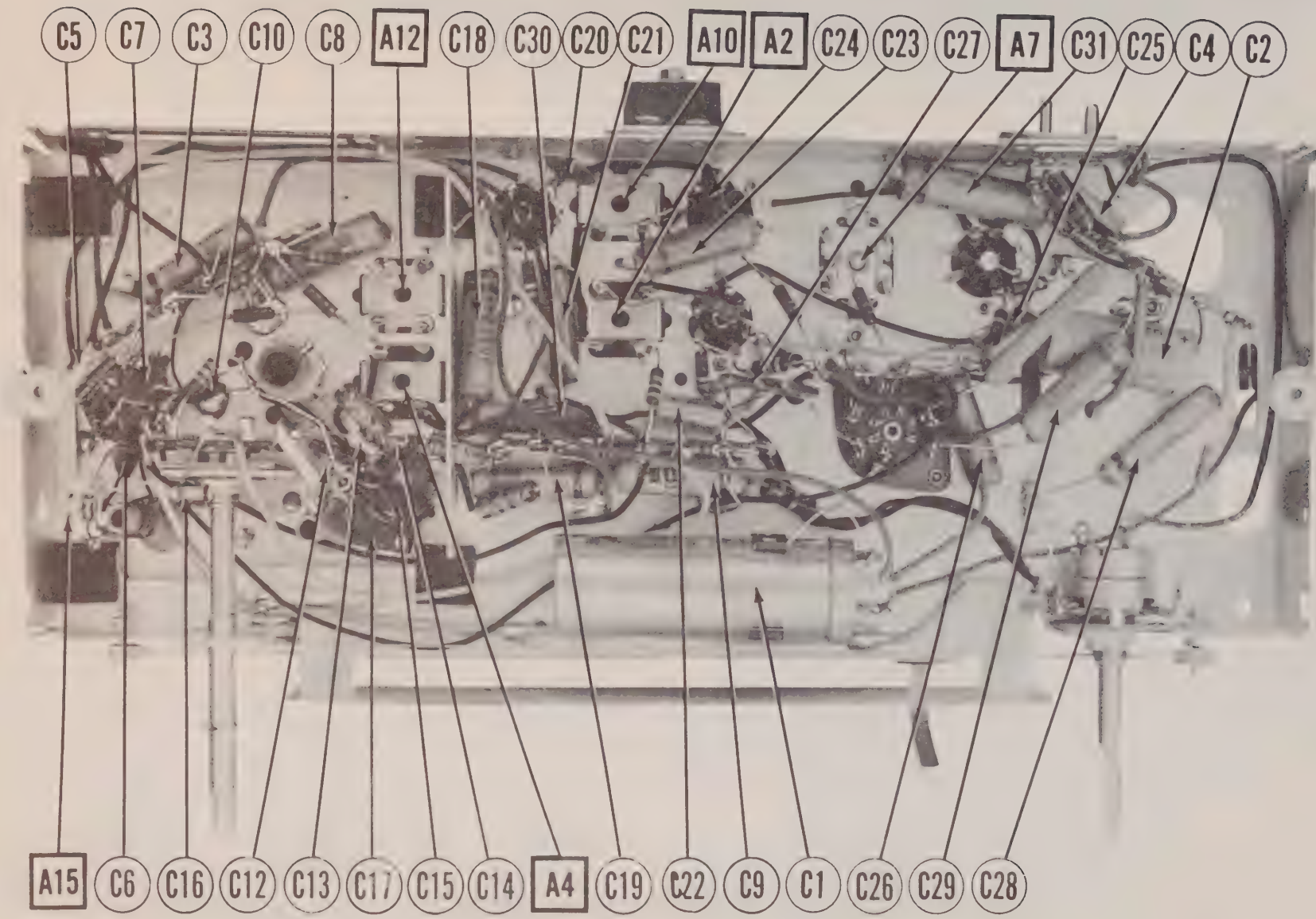
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A15
C6
C16
C12
C13
C17
C15
C14
A4
C19
C22
C9
C1
C26
C29
C28

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1MFD capacitor in series with low side of signal generator and chassis.

To set dial pointer turn tuning gang fully closed and set the left hand edge of the pointer carriage to the second calibration mark on left hand end of pointer carriage slide.

AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to stator on rear section of tuning gang. Low side to chassis.	455KC (400 ∿ Mod.)	AM (CW)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1615KC	"	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC	"	Tune for max. output.	"	A6	Rock tuning gang while adjusting A6 for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (± 1%) resistors in series from point (A) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6BJ6 (V4). Low side to chassis.	10.7MC (Unmod.)	FM (CCW)	Tuning gang fully open	DC Probe to Point (A). Common to chassis.	A7	Adjust for maximum deflection.
5.	.01MFD	"	"	"	"	DC Probe to Point (B). Common to Point (C).	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	.01MFD	High side to pin 1 (Grid) of 12BA6 (V3). Low side to chassis.	"	"	"	DC Probe to Point (A). Common to chassis.	A9, A10	Adjust for maximum deflection.
7.	.01MFD	High side to pin 7 (Grid) of 12AT7 (V1). Low side to chassis.	"	"	"	"	A11, A12	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 12BA6 (V3). Low side to chassis.	10.7MC (450KC Sweep)	FM (CCW)	Tuning gang fully open	Vert. Amp. to Point (A). Low side to chassis.	A7, A9, A10	Disconnect stabilizer cap C2. Adjust for maximum amplitude and symmetry as per figure 1.
5.	.01MFD	High side to pin 7 (Grid) of 12AT7 (V1). Low side to chassis.	"	"	"	"	A11, A12	"
6.	.01MFD	"	"	"	"	Vert. Amp. to Point (B). Low side to chassis.	A8	Reconnect stabilizer cap. C2. Adjust A8 so 10.7MC occurs at center of crossover lines as per figure 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines. Continue with step 8.

FM RF ALIGNMENT

The signal generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	300Ω carbon res.	High side thru 300Ω to left hand FM antenna terminal. Low side to right hand terminal.	98MC (Unmod.)	FM	Set left hand edge of pointer carriage to second calibration mark from right end of pointer carriage slide.	DC Probe to Point (A). Common to chassis.	A13, A14	Adjust for maximum deflection.
9.	"	"	105MC	"	Tune for max. deflection.	"	A15	Adjust for maximum deflection. Repeat steps 8 and 9 until no further improvement can be made.

FIG. 1

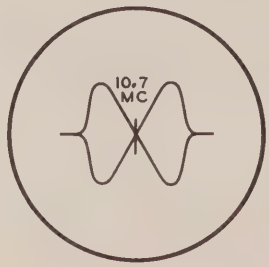
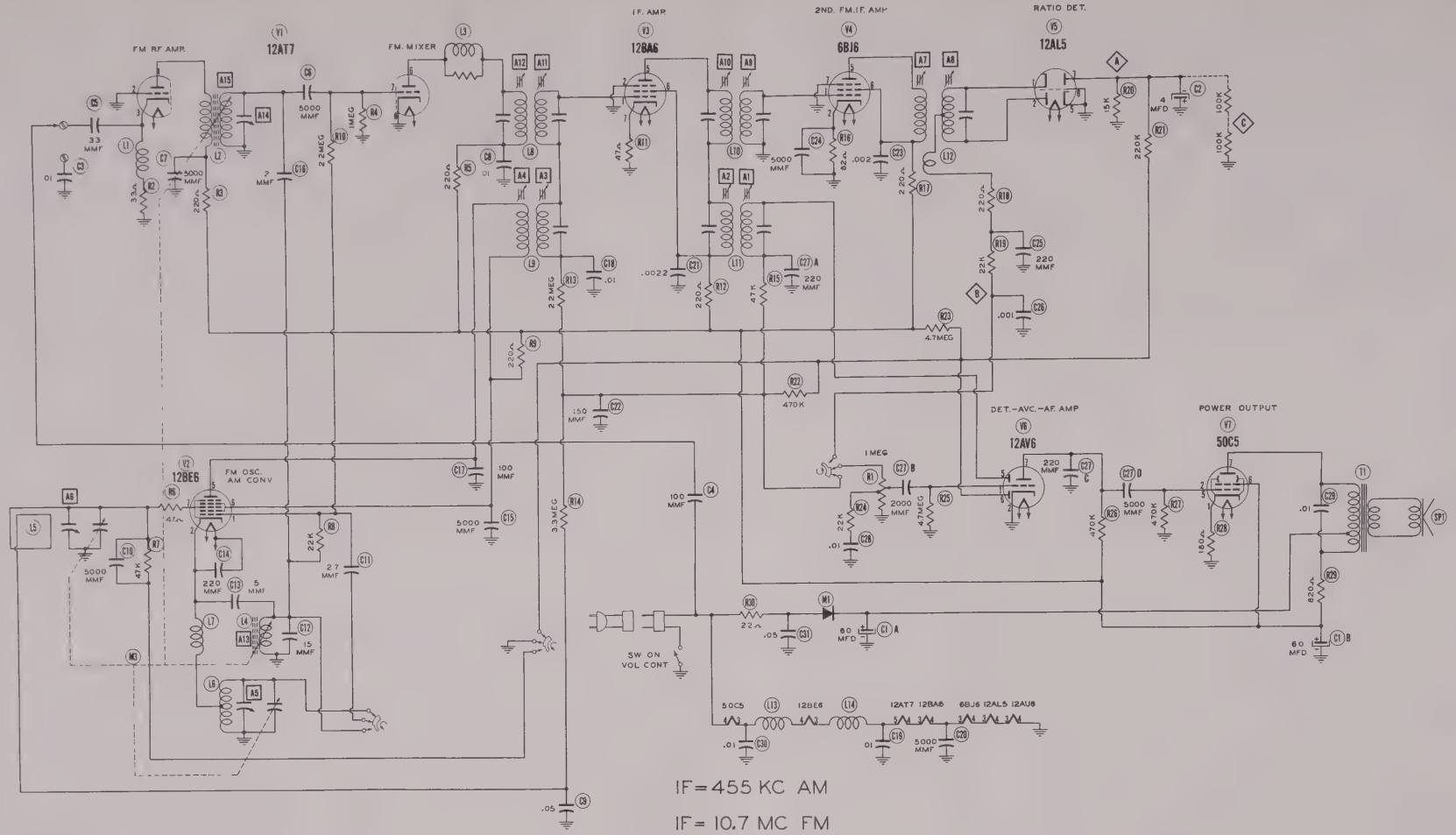


FIG. 2



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
†	V1	12AT7	100VDC	0V	.3VDC	46VAC	58VAC	100VDC	-1.3VDC	0V	50VAC
†	V2A	12BE6	9-2.6VDC	0V	58VAC	71VAC	100VDC	100VDC	-.7VDC		
#	V2B	12BE6	9-10VDC	0V	58VAC	71VAC	100VDC	100VDC	-.8VDC		
†	V3A	12BE6	-.1VDC	0V	46VAC	33VAC	100VDC	100VDC	.5VDC		
#	V3B	12BA6	-.1VDC	0V	46VAC	33VAC	100VDC	100VDC	.8VDC		
†	V4	6BJ6	0V	1VDC	33VAC	26.5VAC	100VDC	100VDC	0V		
†	V5	12AL5	-.5VDC	-.5VDC	26.5VDC	13VAC	0V	0V	-1VDC		
#	V6	12AV6	-.6VDC	0V	13VAC	0V	-.4VDC	0V	63VDC		
#	V7	50C5	7.3VDC	1VDC	71VAC	117VAC	.1VDC	105VDC	130VDC		

† TAKEN WITH VACUUM TUBE VOLTMETER
‡ TAKEN IN FM POSITION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
†	V1	12AT7	†1.4KΩ	0Ω	33Ω	49Ω	58Ω	†1.4KΩ	600KΩ	0Ω	54Ω
†	V2A	12BA6	20KΩ	2Ω	59Ω	70Ω	†1.4KΩ	†1.4KΩ	47KΩ		
#	V2B	12BE6	20KΩ	0Ω	56Ω	70Ω	†1.4KΩ	†1.4KΩ	3.5 Meg.		
†	V3A	12BA6	2.7 Meg.	0Ω	49Ω	38Ω	†1.4KΩ	†1.4KΩ	47Ω		
#	V3B	12BA6	2.8 Meg.	0Ω	49Ω	38Ω	†1.4KΩ	†1.4KΩ	47Ω		
†	V4	6BJ6	1.8Ω	82Ω	38Ω	32Ω	†1.4KΩ	†1.4KΩ	0Ω		
†	V5	12AL5	1 Meg.	1 Meg.	32Ω	19Ω	0Ω	0Ω	15KΩ		
#	V6	12AV6	4.7 Meg.	0Ω	19Ω	0Ω	400KΩ	0Ω	†470KΩ		
#	V7	50C5	180Ω	470KΩ	7Ω	12Ω	470KΩ	†820Ω	†250Ω		

† MEASURED FROM OUTPUT OF M1
# V & R TAKEN IN BROADCAST POSITION

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		WESTINGHOUSE PART No.	STANDARD REPLACEMENT		
V1	FM RF Amp. -FM Mixer	12AT7	12AT7	9A	
V2	FM Osc. -AM Conv.	12BE6	12BE6	7CH	
V3	1st FM IF Amp. -AM IF Amp.	12BA6	12BA6	7BK	
V4	2nd FM IF Amp.	6BJ6	6BJ6	7CM	
V5	Ratio Det.	12AL5	12AL5	6BT	
V6	DET. -AVC-AF	12AV6	12AV6	7BT	
V7	Power Output	50C5	50C5	7CV	

CAPACITORS

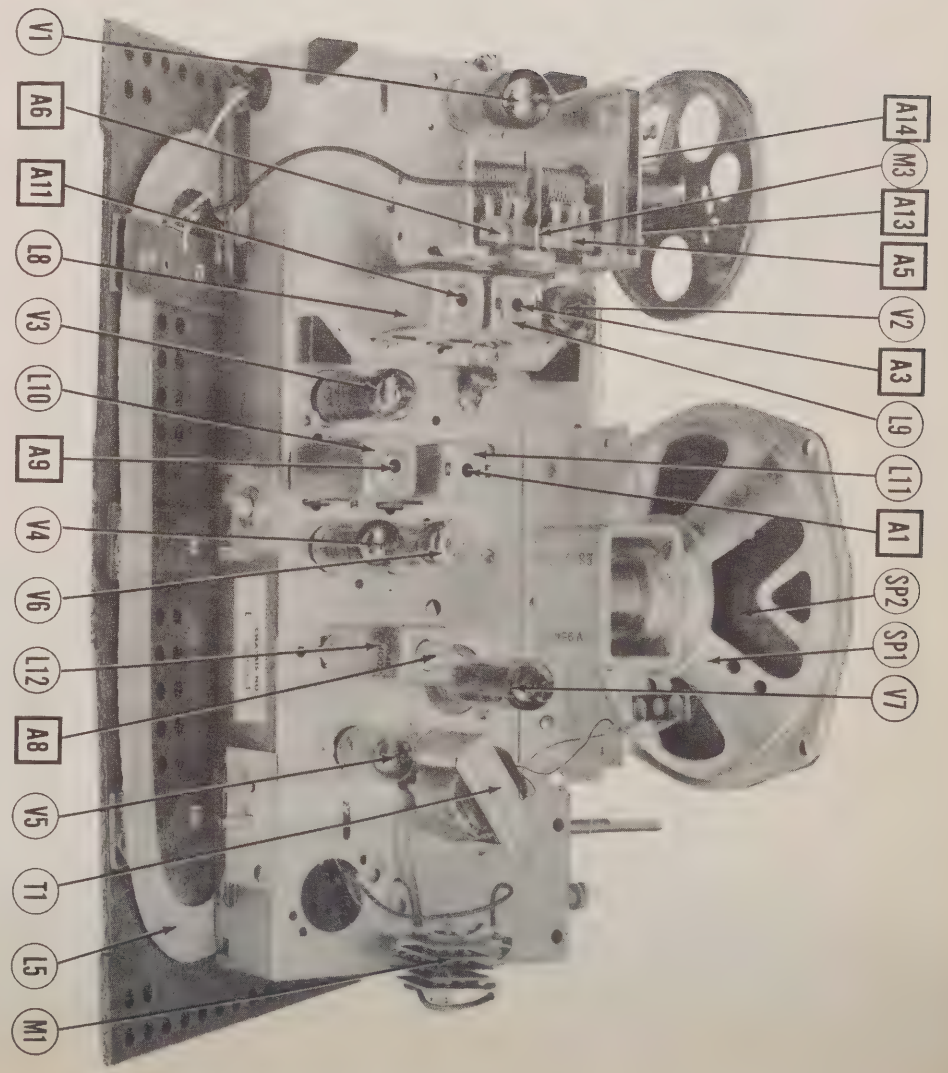
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA WESTINGHOUSE PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	80	150	V-9635	AF1212D			D11402	■ Filter
B	60	150						▲ Filter
C2	4	50	V-4637	PRS150/4			UT-41	Stabilizing Cap.
C3	.01	200	RCP10W2103M	P488-01	D6-103	811-01	TM-11	Ant. Isolation
C4	100	500	RCM20A101M	1468-0001	D6-101	GP1K-100	1FM-31	Line Ant. Coupling
C5	33		R3CC30SL330K	GP33M	D6-330	GP1K-33	MS-43	Ant. Coupling
C6	5000		V-5596	BPD-5	D6-502	811-005	29C1	RF Coupling
C7	5000		V-5596	BPD-5	D6-502	811-005	29C1	FM RF Plate Decoupling
C8	.01	400	RCP10W4103M	P488-01	D6-103	811-01	TM-11	FM Mixer Plate Decoupling
C9	.05	200	RCP10W2503M	P288-05			TM-15	AVC Filter
C10	5000		V-5596	BPD-5	D6-502	811-005	29C1	RF Bypass
C11	27		R2CC30UK270K	CN27KN750	DN-27	GP1K-27	MS-425	Osc. Grid Cap.
C12	15			CI15GNPO	D2-15	NPOK-15	MS-415	Fixed Trimmer
C13	5		R2CC30UK050D	CN5DN750	DN-5	GP1K-5	MS-55	Osc. Feedback
C14	220		R5CC20ZY221M	GP220M	D6-221	GP2K-220	1FM-325	Filament Bypass
C15	5000		V-5596	BPD-5	D6-502	811-005	29C1	Osc. Anode Bypass
C16	2		R2CC30CK020D	CN2DNPO	D2-2.2			Osc. Coupling
C17	100	500	RCM20D101J	1469-0001	D2-100	NPOM-100	MS-31	Fixed Trimmer
C18	.01	200	RCP10W2103M	P488-01	D6-103	811-01	TM-11	AVC Filter
C19	.01	200	RCP10W2103M	P488-01	D6-103	811-01	TM-11	Filament Bypass
C20	5000		V-5596	BPD-5	D6-502	811-005	29C1	1st IF Filament Bypass
C21	.0022	600	RCP10W6202M	P688-0022	D6-222	GP2M-0022	TM-22	1st IF Decoupling
C22	150	500	RCM20A151M	1468-00015	D6-151	GP2K-150	1FM-315	Diode RF Filter
C23	.002	600	RCP10W6202M	P688-002	D6-202	GP2M-002	TM-22	2nd IF Decoupling
C24	5000		V-5596	BPD-5	D6-502	811-005	29C1	2nd IF Cath. Bypass
C25	220	500	RCM20A221M	1468-00025	D6-221	GP2K-220	1FM-325	Diode Load Cap.
C26	.001	600	RCP10W6102M	P688-001	D6-102	GP2L-001	TM-21	De-emphasis
C27A	220		V-9634-1	GP220M	D6-221	GP2K-220		Diode RF Filter
B	2000			GP2000M	D6-202	GP2L-002	34C3	Audio Coupling
C	220			GP220M	D6-221	GP2K-220		AF Amp. Plate Bypass
D	5000			GP5000M	D6-502	811-005		Audio Coupling
C28	.01	200	RCP10W2103M	P488-01	D6-103	811-01	TM-11	Tone Compensation
C29	.01	400	RCP10W4103M	P488-01	D6-103	811-01	TM-11	Output Plate Bypass
C30	.01	200	RCP10W2103M	P488-01	D6-103	811-01	TM-11	Filament Bypass
C31	.05	400	V-6023-4503M	P488-05			TM-15	Line Filter

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WESTING. PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	V-9673-1	Q13-137X	T-109	BT-72-S	Volume control, tapped at 200KΩ
B	Switch		Not Req.	76-1	SW-A	Not Req.	Attach to R1A per instructions

CHASSIS—TOP VIEW



SET 100

FOLDER 13

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	WESTINGHOUSE PART No.	IRC PART No.	
R2	33Ω	1/2	RC20AE330M		FM RF Cathode
R3	220Ω	1/2	RC20AE221M		FM RF Plate Decoupling
R4	1 Meg.	1/2	RC20AE105M	BTS-1 Meg.	FM Mixer Grid
R5	220Ω	1/2	RC20AE221M		FM Mixer Plate Decoupling
R6	47Ω	1/2	RC20AE470M		Parasitic Supp.
R7	47KΩ	1/2	RC20AE473M	BTS-47K	AM Conv. Grid
R8	22KΩ	1/2	RC20AE223M	BTS-22K	Osc. Grid
R9	220Ω	1/2	RC20AE221M		Conv. Decoupling
R10	2.2 Meg.	1/2	RC20AE225M	BTS-2.2 Meg.	Osc. Feedback
R11	47Ω	1/2	RC20AE470M		1st IF Cathode
R12	220Ω	1/2	RC20AE221M		1st IF Decoupling
R13	2.2 Meg.	1/2	RC20AE225M	BTS-2.2 Meg.	AVC Network
R14	3.3 Meg.	1/2	RC20AE335M	BTS-3.3 Meg.	AVC Network
R15	47KΩ	1/2	RC20AE473M	BTS-47K	Diode Filter
R16	82Ω	1/2	RC20AE820K		2nd FM IF Cathode
R17	220Ω	1/2	RC20AE221M		2nd FM IF Decoupling
R18	220Ω	1/2	RC20AE221M		Balancing
R19	22KΩ	1/2	RC20AE223M	BTS-22K	De-emphasis
R20	15KΩ	1/2	RC20AE153K	BTS-15K	Ratio Det. Diode Load
R21	220KΩ	1/2	RC20AE224M	BTS-220K	AVC Network
R22	470KΩ	1/2	RC20AE474M	BTS-470K	AVC Network
R23	4.7 Meg.	1/2	RC20AE475M	BTS-4.7 Meg.	Delayed AVC
R24	22KΩ	1/2	RC20AE223M	BTS-22K	Tone Compensation
R25	4.7 Meg.	1/2	RC20AE475M	BTS-4.7 Meg.	AF Amp. Grid
R26	470KΩ	1/2	RC20AE474M	BTS-470K	AF Amp. Plate
R27	470KΩ	1/2	RC20AE474M	BTS-470K	Output Grid
R28	180Ω	1	RC30AE181K	BW-1-180	Output Cathode
R29	820Ω	5	V-6984-10		Filter-Wire Wound
R30	22Ω	1	RC30AE220K		Surge Limiter

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		WESTING. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	2000Ω	4.3Ω	245Ω Tap @ 8.5Ω	.8Ω	V-9665	A-3330	A-3031	RO-3	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			WESTINGHOUSE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-803		
SP1	PM	4.3Ω	V-9641	MOD. P525-V	52A1	
	CONE DIA.	V. C. DIA.				
SP2	5"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	WESTINGHOUSE PART No.	MEISSNER PART No.	
L1	FM Ant. Loading	.5Ω		V-4886-10		
L2	FM RF	.2Ω	.2Ω	V-9674		
L3	Para. Supp.	.1Ω		V-4886-6		
L4	FM Osc.	.5Ω		V-9675		Includes C12
L5	Loop Ant.	2.2Ω		V-9653		
L6	AM Osc.	10Ω		V-9672	14-1073	Tap at 1.2Ω
L7	RF Choke	.8Ω		V-9099-1		
L8	1st FM IF	1.6Ω	1.6Ω	V-9688	16-3487	
L9	1st AM IF	16Ω	16Ω	V-9649-1	16-6758	
L10	2nd FM IF	1.6Ω	1.6Ω	V-9642	16-3487	
L11	2nd AM IF	17Ω	17Ω	V-6130-1	16-6758	
L12	Ratio Det. Trans.	3.2Ω	.5Ω	V-9048		
L13	Fil. Choke	.8Ω		V-9099-1		
L14	Fil. Choke	.8Ω		V-9099-1		

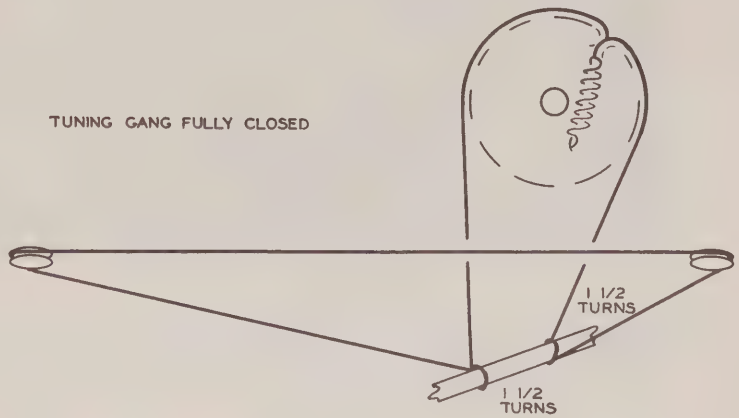
PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	WESTINGHOUSE PART No.	SYLVANIA PART No.		
M1	.079ADC	V-9640	NC-5		

MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
M2	Switch	V-9681-1	Band
M3	2 Gang Var. Cap.	V-9671	(31-532MMF, 36-251MMF)
A14	Trimmer	V-9670	FM RF Adj.
	Cabinet	V-1199-2	Brown
	Cabinet	V-1199-3	Ivory
	Dial Pointer	V-9639-1	
	Knob	V-6146-11	On/Off-Volume, Front (Ivory)
	Knob	V-6146-5	On/Off-Volume, Front (Brown)
	Knob	V-6146-10	Band (Ivory)
	Knob	V-6146-2	Band (Brown)
	Knob	V-9104-3	On/Off-Volume, Rear-(Ivory)
	Knob	V-9104-2	Tuning, Rear (Brown)



DIAL CORD DRIVE

PHOTOFACT* Folder

*TRADE MARK

WESTINGHOUSE MODELS
H-603C12, H-608C12 (CH. V-2152-01 & V-2149-3)

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MODEL H-603C12

WESTINGHOUSE MODELS
H-603C12, H-608C12 (CH. V-2152-01 & V-2149-3)

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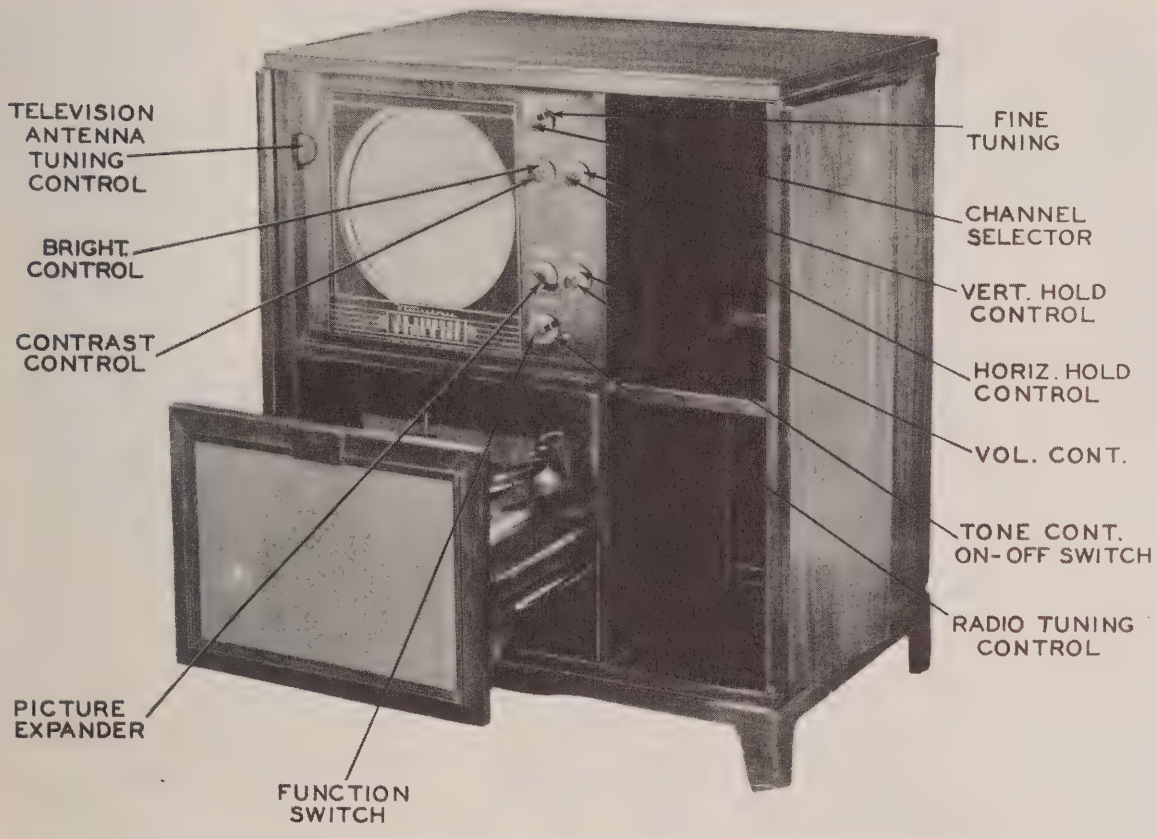

WESTINGHOUSE MODELS H-603C12, H-608C12 (Ch. V-2152-01 and V-2149-3)

WESTINGHOUSE MODEL H-603C12

TRADE NAME	Westinghouse, Models H-603C12, H-608C12 (Ch. V-2152-01 and Audio Amplifier Chassis V-2149-3)
MANUFACTURER	Westinghouse Electric Corp., Home Radio Div., Sunbury, Pa.
TYPE SET	AM-FM-TV-Phono Combination Receiver
TUBES	Thirty Three
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING 2.8 Amp. at 117 Volts AC
TUNING RANGE—	TV Channels 2 thru 13, FM 88-108MC, AM 540-1600KC

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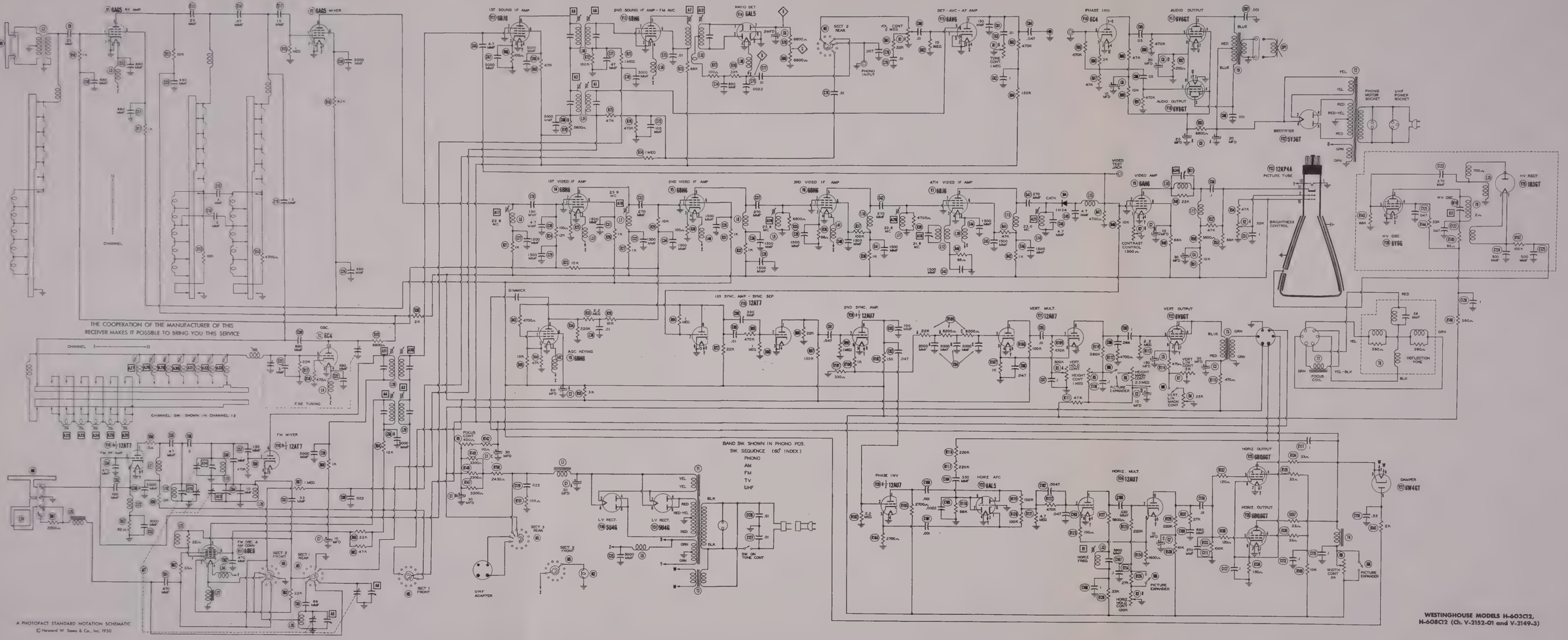
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CHANNEL SW. SHOWN IN CHANNEL 13
BAND SW. SHOWN IN PHONO POS.
SW. SEQUENCE (60° INDEX.)
PHONO
AM
FM
TV
UHF
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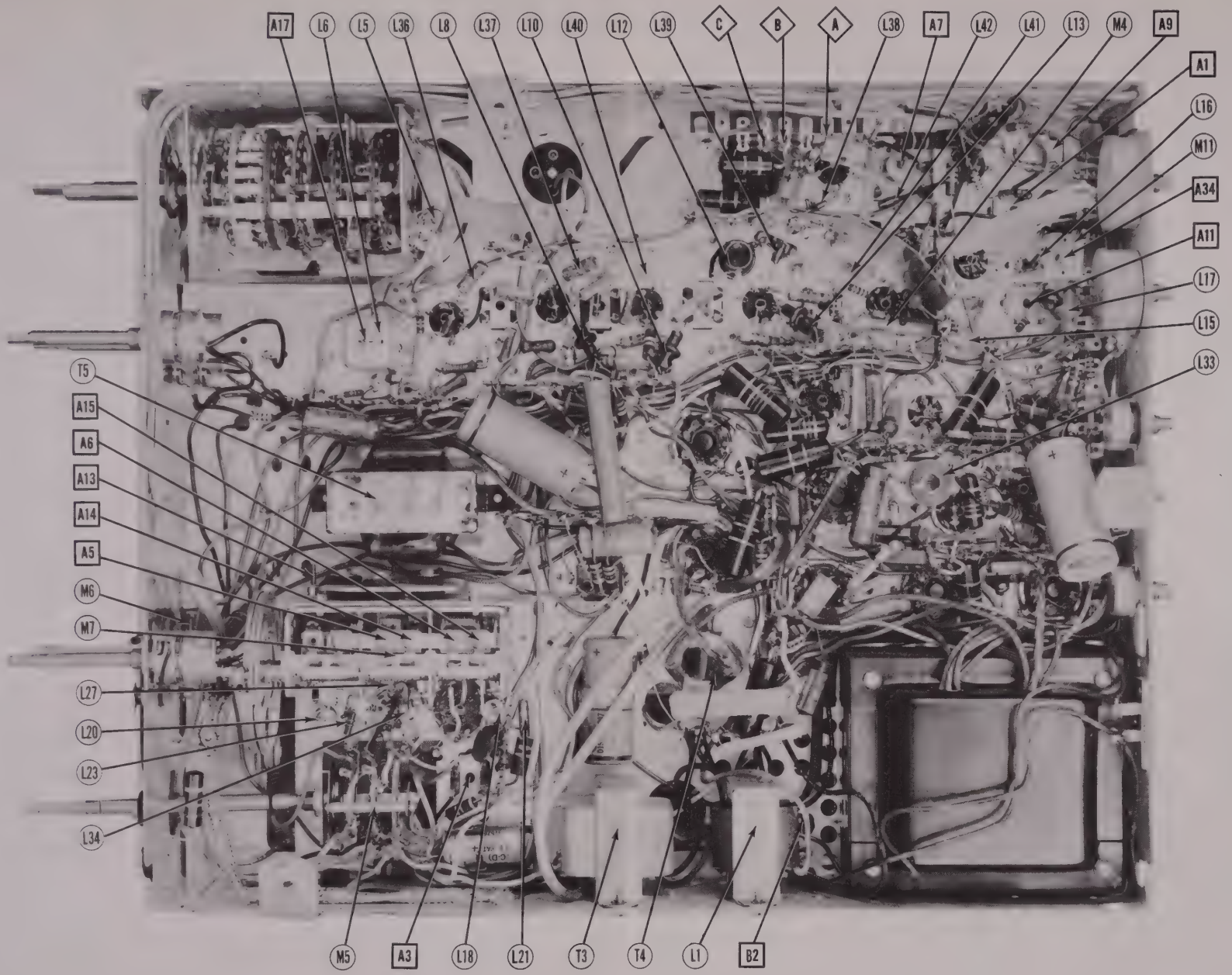
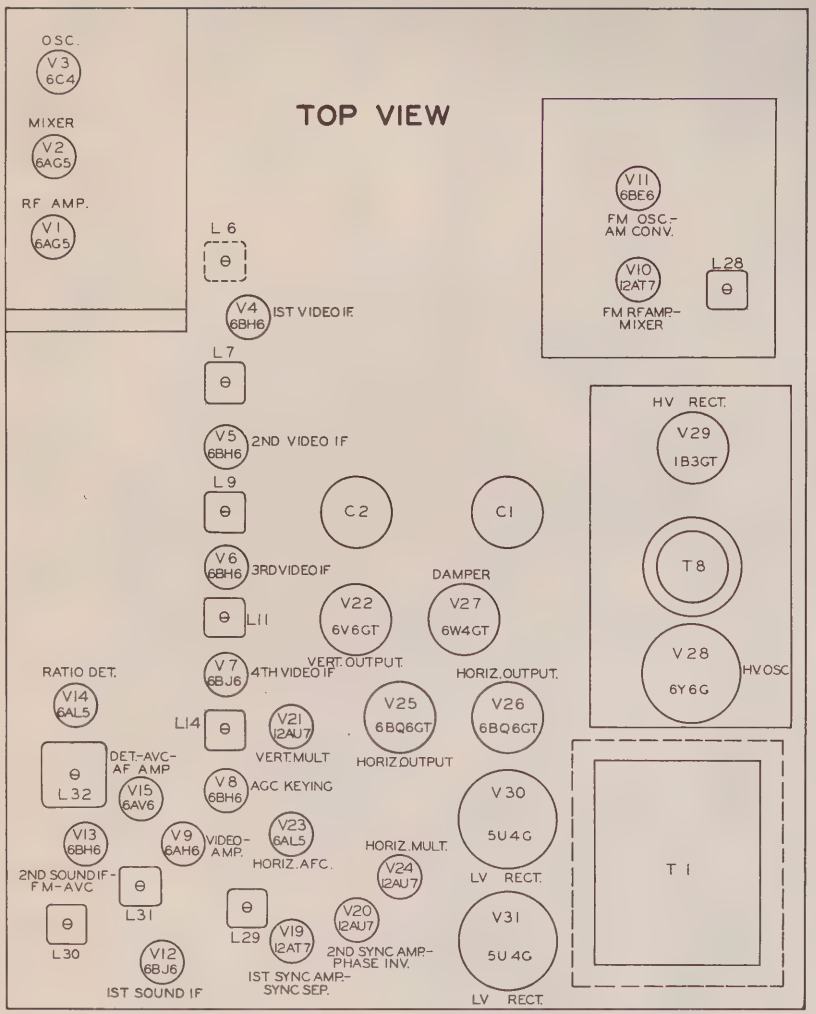
WESTINGHOUSE MODELS H-603C12, H-608C12 (Ch. V-2152-01 and V-2149-3)

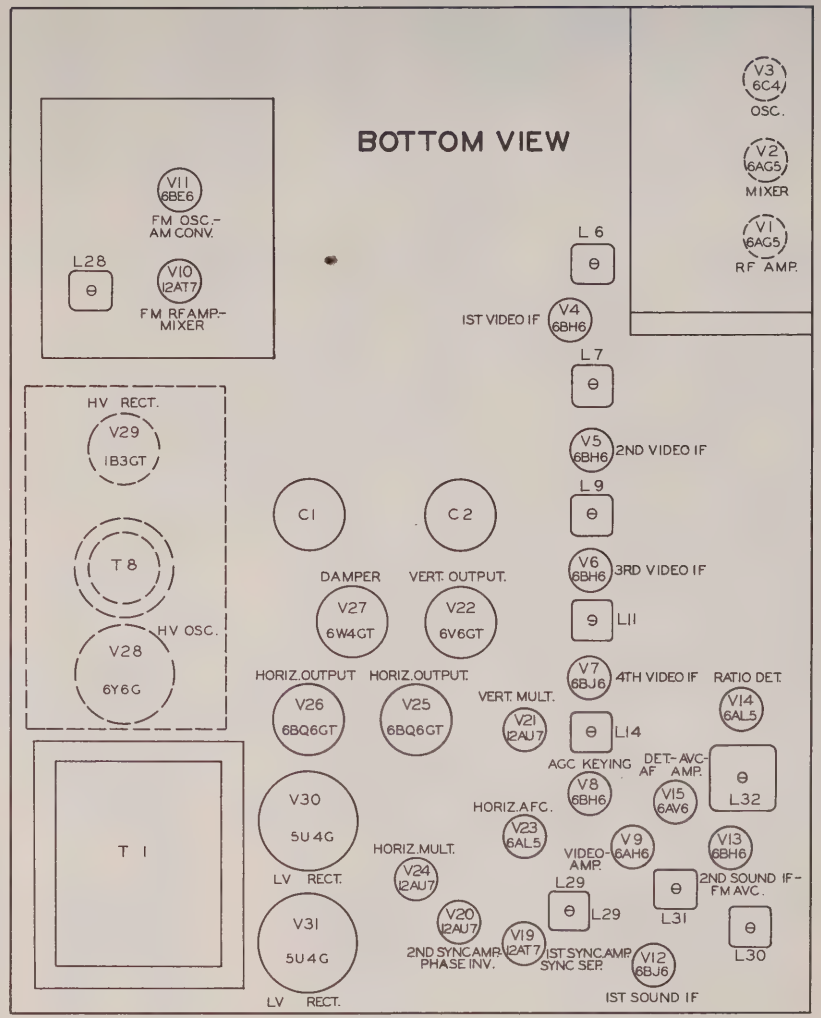
WESTINGHOUSE MODELS H-603C12, H-608C12 (Ch. V-2152-01 and V-2149-3)

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

WESTINGHOUSE MODELS H-603C12, H-608C12 (Ch. V-2152-01 and V-2149-3)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the high voltage oscillator tube (V28). If complete receiver alignment is to be performed it should be done in the order outlined.

AM RADIO ALIGNMENT

Turn the function selector switch to AM (second position clockwise).
To set pointer turn tuning cap fully closed and set pointer to last reference mark at low frequency end of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to stator on rear "AM" section of tuning gang. Low side to chassis.	455KC (400 ∿ Mod.)	AM (second position CW)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	.1MFD	"	1615KC	"	"	"	A5	"
3.		Loop	1400KC	"	Tune for max. output	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM AND TV SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Turn the function switch to FM (third position clockwise).
If AM alignment is necessary, it should be performed before FM alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to stator on rear "FM" section of tuning gang.	4.5MC (Unmod.)	FM (third position CW)	Tuning gang fully closed	DC Probe to Point Ⓐ. Common to chassis.	A7, A8, A9, A10, A11	Adjust for maximum deflection.
5.	.01MFD	"	"	"	"	DC Probe to Point Ⓑ. Common to Point Ⓒ.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Continue with step 7.

FM AND TV SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

See notes under IF VTVM Alignment.
Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (Grid) of 6BJ6 (V12). Low side to chassis.	10.7MC (450KC Sweep)	FM (third position CW)	Tuning gang fully closed	Vert. Amp. to Point Ⓐ. Low side to chassis.	A7, A8 A9	Disconnect stabilizer capacitor C6. Adjust for maximum amplitude and symmetry as per figure 1.
5.	.01MFD	High side to stator on rear "FM" section of tuning gang. Low side to chassis.	"	"	"	"	A10, A11	"
6.	.01MFD	"	"	"	"	Vert. Amp. to Point Ⓑ. Low side to chassis.	A12	Reconnect capacitor C6. Adjust A12 so 4.5MC occurs at center of crossover lines as per figure 2. Slightly retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7.	300Ω carbon res.	High side thru 300Ω to ungrounded "FM" antenna terminal. Low side to chassis.	108.5MC (Unmod.)	FM	Tuning gang fully open	DC Probe to Point Ⓐ. Common to chassis.	A13	Adjust for maximum deflection.
8.	"	"	105MC	"	Tune for max. deflection.	"	A14, A15	Rock tuning gang while adjusting A14 and A15 for maximum deflection.

VIDEO IF ALIGNMENT

Turn the function selector switch to TV (fourth position clockwise).
Remove the local oscillator tube (V3) from its socket to prevent erroneous indications.
Attenuate the signal generator to maintain 2 volt reading on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	Direct	High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	21.6MC (Unmod.)	Any	DC Probe to "video test jack". Common to chassis.	A16	Adjust for MINIMUM deflection.
10.	Direct	"	22.6MC	"	"	A17	Adjust for maximum deflection.
11.	Direct	"	25.9MC	"	"	A18	"
12.	Direct	"	25.6MC	"	"	A19	"
13.	Direct	"	23.8MC	"	"	A20	"
14.	Direct	"	23.0MC	"	"	A21	"

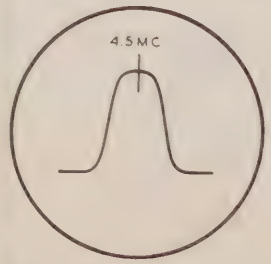


FIG. 1

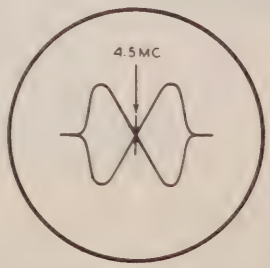


FIG. 2

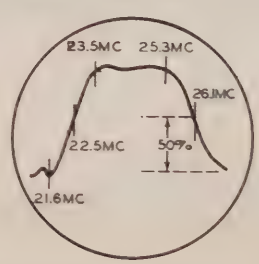


FIG.3

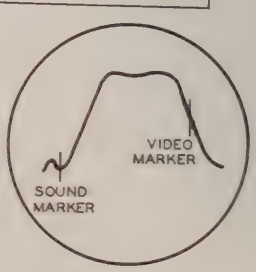


FIG.4

ALIGNMENT INSTRUCTIONS (CONT.)

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
Connect a 200KΩ resistor in series with the oscilloscope vertical input lead, and a 500MMF capacitor across the vertical input terminals.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Direct	High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	25MC (10MC SWP)	21.6MC 22.5MC 23.5MC 26.1MC	Any	Vert. Amp. to "video test jack". Low side to chassis.		Check for response curve similar to figure 3. If necessary retouch A16 thru A21 for optimum response.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	.001MFD	High side to "video test jack". Low side to chassis.	Not used	4.5MC (400 ∿ Mod.)	Any	Vert. Amp. to pin 11 (cathode) of picture tube. Low side to chassis.	A34	Adjust for minimum 400 ∿ response on scope.

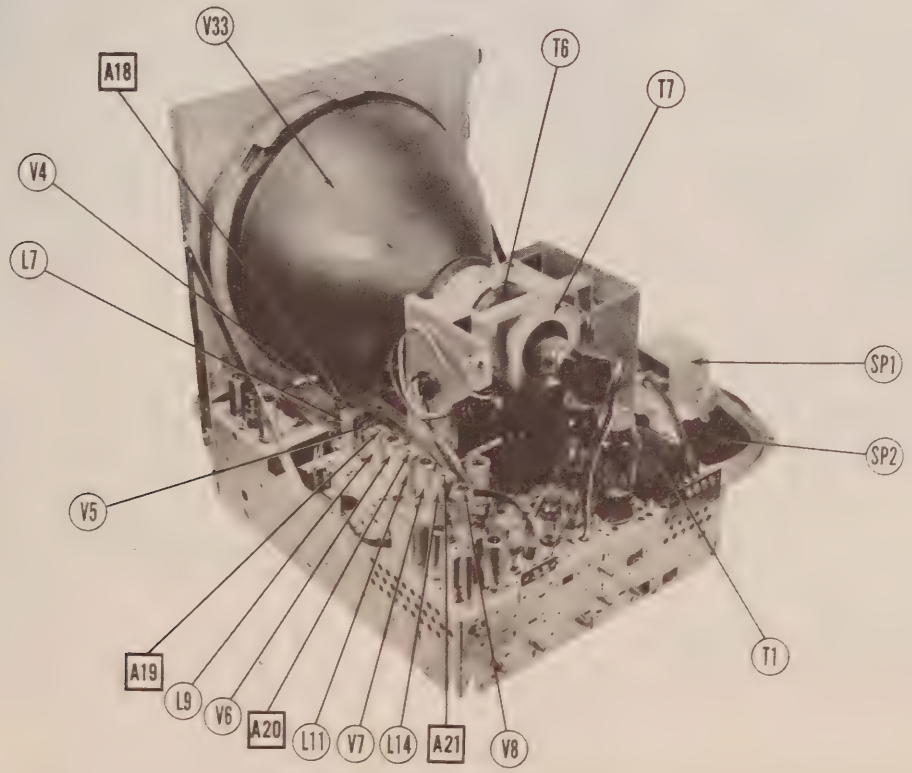
OSCILLATOR ALIGNMENT (SHOP ADJUSTMENT)

Replace the local oscillator tube (V2).
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω carbon res.	Across "TV" antenna terminals with 120Ω in each lead.	57MC (10MC SWP)	55.25MC 59.75MC	2	Vert. Amp. to "video test jack". Low side to chassis.	A22	Adjust to place sound marker as shown in figure 4. The video marker should fall at 50%.
			63MC (10MC SWP)	61.25MC 65.75MC	3		A23	
			69MC (10MC SWP)	67.25MC 71.75MC	4		A24	
			79MC (10MC SWP)	77.25MC 81.75MC	5		A25	
			85MC (10MC SWP)	83.25MC 87.75MC	6		A26	
			177MC (10MC SWP)	175.25MC 179.75MC	7		A27	
			183MC (10MC SWP)	181.25MC 185.75MC	8		A28	
			189MC (10MC SWP)	187.25MC 191.75MC	9		A29	
			195MC (10MC SWP)	193.25MC 197.75MC	10		A30	
			201MC (10MC SWP)	199.25MC 203.75MC	11		A31	
			207MC (10MC SWP)	205.25MC 209.75MC	12		A32	
			213MC (10MC SWP)	211.25MC 215.75MC	13		A33	

OSCILLATOR ALIGNMENT (FIELD ADJUSTMENT)

Turn the receiver on an allow a few minutes warm up.
Turn the fine tuning control to the mid-position of its range.
Turn the channel switch to the lowest channel station available.
Adjust the appropriate oscillator slug (A22 thru A33) for best picture detail.
Adjust the oscillator slug for each channel a station can be received on, starting with the lowest channel and working towards the highest.
The RF and mixer circuits are pre-set at the factory and are very stable, they should not require adjustment in the field.



CHASSIS-TOP VIEW

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-1.4VDC	0V.	6.3VAC	0V.	155VDC	130VDC	0V.		
V 2	6AG5	-.1VDC	0V.	6.3VAC	0V.	340VDC	150VDC	0V.		
V 3	6C4	225VDC	0V.	0V.	6.3VAC	225VDC	§-4.5VDC	5.9VDC		
V 4	6BH6	-1.4VDC	.7VDC	6.3VAC	0V.	320VDC	130VDC	0V.		
V 5	6BH6	-.5VDC	.7VDC	6.3VAC	0V.	320VDC	130VDC	0V.		
V 6	6BH6	0V.	.6VDC	6.3VAC	0V.	320VDC	100VDC	0V.		
V 7	6BJ6	0V.	1VDC	6.3VAC	0V.	320VDC	125VDC	0V:		
V 8	6BH6	55VDC	110VDC	6.3VAC	0V.	.1VDC	135VDC	110VDC		
V 9	6AH6	-.3VDC	0V.	0V.	6.3VAC	270VDC	280VDC	5VDC		
V 10	12AT7	†185VDC	‡ -.1VDC	‡ .7VDC	‡ 0V.	‡ 0V.	†110VDC	‡ -.9VDC	‡ 0V.	6.3VAC
V 11	6BE6	‡§-3VDC ♦§-2.9VDC	0V.	0V.	6.3VAC	200VDC	110VDC	‡ 0V. ♦-.3VDC		
V 12	6BJ6	0V.	1.5VDC	0V.	6.3VAC	260VDC	135VDC	0V.		
V 13	6BH6	-.6VDC	0V.	0V.	6.3VAC	75VDC	75VDC	0V.		
V 14	6AL5	-3.4VDC	-.4VDC	6.3VAC	0V.	0V.	0V.	-4.6VDC		
V 15	6AV6	-.5VDC	0V.	0V.	6.3VAC	0V.	♦-.3VDC	75VDC		
V 16	6C4	190VDC	75VDC	0V.	6.3VAC	190VDC	22.5VDC	80VDC		
V 17	6V6GT	0V.	0V.	330VDC	290VDC	.1VDC	270VDC	6.3VAC	15.5VDC	
V 18	6V6GT	0V.	0V.	330VDC	290VDC	.1VDC	0V.	6.3VAC	15.5VDC	
V 19	12AT7	36VDC	-1.3VDC	0V.	0V.	0V.	55VDC	-.1VDC	0V.	6.3VAC
V 20	12AU7	315VDC	0V.	14VDC	0V.	0V.	95VDC	0V.	3.7VDC	6.3VAC
V 21	12AU7	70VDC	.8VDC	3VDC	0V.	0V.	115VDC	-27VDC	3VDC	6.3VAC
V 22	6V6GT	0V.	0V.	355VDC	355VDC	-13.5VDC	0V.	6.3VAC	41VDC 9.5VDC	
V 23	6AL5	5VDC	-3VDC	6.3VAC	0V.	0V.	0V.	0V.		
V 24	12AU7	155VDC	.3VDC	9.2VDC	6.3VAC	6.3VAC	124VDC	-2.4VDC	8.8VDC	0V.
V 25	6BQ6GT	0V.	0V.	100VDC	100VDC	-3.4VDC	-3.4VDC	6.3VAC	14.5VDC	TOP CAP *
V 26	6BQ6GT	0V.	0V.	100VDC	100VDC	-3.4VDC	-3.4VDC	6.3VAC	14.5VDC	TOP CAP *
V 27	6W4GT	225VDC	225VDC	225VDC	0V.	41VDC	0V.	▲0V.	▲6.3VAC	
V 28	6Y6G	0V.	0V.	305VDC	95VDC	-41VDC	0V.	6.3VAC	0V.	
V 29	1B3GT	* DO NOT MEASURE.								
V 30	5U4G	0V.	395VDC	0V.	340VAC	0V.	340VAC	0V.	395VDC	
V31	5U4G	0V.	395VDC	0V.	340VAC	0V.	340VAC	0V.	395VDC	
V32	5Y3GT	0V.	340VDC	0V.	330VAC	0V.	330VAC	0V.	340VDC	
V33	12KP4A	0V.	0V.	PIN 10 330VDC	PIN 11 155VDC	PIN 12 6.3VAC				

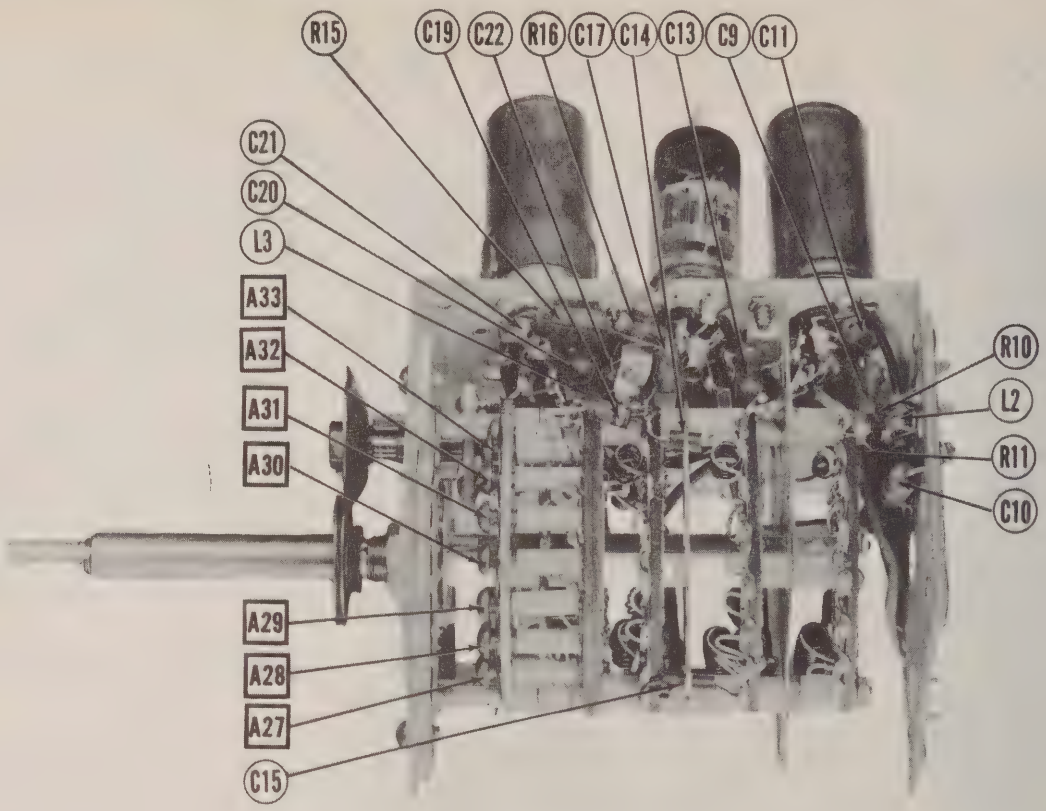
ALL MEASUREMENTS TAKEN IN "TV" POSITION UNLESS OTHERWISE NOTED.
* DO NOT MEASURE.
♦ MEASURED IN "AM" POSITION.
‡ MEASURED IN " FM" POSITION.
§ TAKEN WITH VACUUM TUBE VOLTMETER.
▲ MEASURED FROM PIN 3 OF V27.

RESISTANCE READINGS

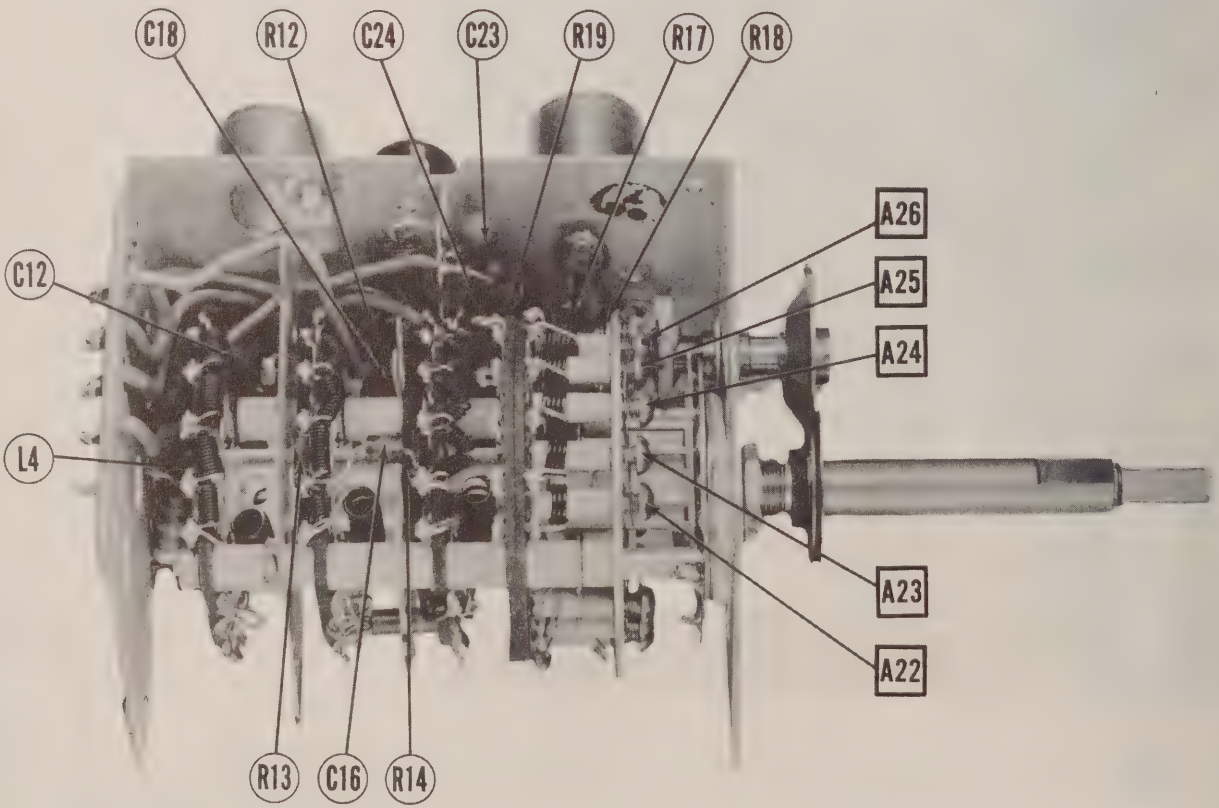
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	2.5 Meg.	0Ω	.1Ω	0Ω	†12KΩ	†4KΩ	0Ω		
V 2	6AG5	1 Meg.	0Ω	.1Ω	0Ω	†1.3KΩ	†84KΩ	0Ω		
V 3	6C4	†9KΩ	Inf.	0Ω	.1Ω	†9KΩ	22KΩ	470Ω		
V 4	6BH6	2.5 Meg.	100Ω	.1Ω	0Ω	†1.2KΩ	†4KΩ	0Ω		
V 5	6BH6	2.5 Meg.	100Ω	.1Ω	0Ω	†1.2KΩ	†4KΩ	0Ω		
V 6	6BH6	.2Ω	68Ω	.1Ω	0Ω	†1.2KΩ	†100KΩ	0Ω		
V 7	6BJ6	.2Ω	68Ω	.1Ω	0Ω	†1.2KΩ	†48KΩ	0Ω		
V 8	6BH6	†27KΩ	†11KΩ	.1Ω	0Ω	220KΩ;	†3KΩ	†11KΩ		
V 9	6AH6	4.7KΩ	0Ω	0Ω	.1Ω	†13KΩ	†68KΩ	1.5KΩ		
V 10	12AT7	‡ †14KΩ	‡ 1 Meg.	‡ 82Ω	‡ 0Ω	‡ 0Ω	‡ † 18KΩ	‡470KΩ	‡ 0Ω	‡ .1Ω
V 11	6BE6	♦22KΩ	♦0Ω	♦0Ω	♦.1Ω	♦†18KΩ	♦†17KΩ	‡ 33Ω ♦2.5 Meg.		
V 12	6BJ6	1 Meg.	100Ω	0Ω	.1Ω	†6.5KΩ	†47KΩ	0Ω		
V 13	6BH6	100KΩ	0Ω	0Ω	.1Ω	†68KΩ	†68KΩ	0Ω		
V 14	6AL5	Inf.	Inf.	.1Ω	0Ω	0Ω	0Ω	13KΩ		
V 15	6AV6	♦10 Meg.	♦0Ω	♦0Ω	♦.1Ω	♦0Ω	♦420KΩ	♦† 620KΩ		
V 16	6C4	#65KΩ	47KΩ	0Ω	.1Ω	#65KΩ	520KΩ	50KΩ		
V 17	6V6GT	0Ω	0Ω	#160Ω	#7KΩ	470KΩ	Inf.	.1Ω	200Ω	
V 18	6V6GT	0Ω	0Ω	#140Ω	#7KΩ	470KΩ	#16KΩ	.1Ω	200Ω	
V 19	12AT7	†30KΩ	1 Meg.	0Ω	0Ω	0Ω	†26KΩ	14KΩ	0Ω	.1Ω
V 20	12AU7	†3KΩ	2.2 Meg.	2.7KΩ	0Ω	0Ω	†18KΩ	1 Meg.	1.3KΩ	.1Ω
V 21	12AU7	†100KΩ	39KΩ	1000Ω	0Ω	0Ω	†800KΩ †480KΩ	550KΩ	1000Ω	.1Ω
V 22	6V6GT	2000Ω 10Ω	0Ω	†1.2KΩ	†1.2KΩ	2.2 Meg.	Inf.	.1Ω	2.5KΩ 470Ω	
V 23	6AL5	4.8 Meg.	4.8 Meg.	.1Ω	0Ω	68KΩ	0Ω	68KΩ		
V 24	12AU7	†40KΩ	5.2 Meg.	1.9KΩ	.1Ω	.1Ω	†230KΩ	360KΩ	1.8KΩ	0Ω
V 25	6BQ6GT	68KΩ	0Ω	†12KΩ	†12KΩ	100KΩ	100KΩ	.1Ω	150Ω	TOP CAP †650Ω
V 26	6BQ6GT	100Ω	0Ω	†12KΩ	†12KΩ	100KΩ	100KΩ	.1Ω	150Ω	TOP CAP †650Ω
V 27	6W4GT	†650Ω	†650Ω	†620Ω	Inf.	†5KΩ	Inf.	▲.1Ω	▲0Ω	
V 28	6Y6G	0Ω	0Ω	†850Ω	†34KΩ	68KΩ	23Ω	.1Ω	0Ω	
V 29	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP 750Ω
V 30	5U4G	Inf.	20KΩ	Inf.	23Ω	Inf.	23Ω	Inf.	20KΩ	
V31	5U4G	Inf.	20KΩ	Inf.	25Ω	Inf.	25Ω	Inf.	20KΩ	
V32	5Y3GT	0Ω	80KΩ	Inf.	200Ω	Inf.	210Ω	Inf.	80KΩ	
V33	12KP4A	0Ω	8Ω	PIN 10 †180Ω	PIN 11 36KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V30.
‡ MEASURED IN "FM" POSITION.
♦ MEASURED IN "AM" POSITION.
MEASURED FROM PIN 8 OF V32.
▲ MEASURED FROM PIN 3 OF V27.

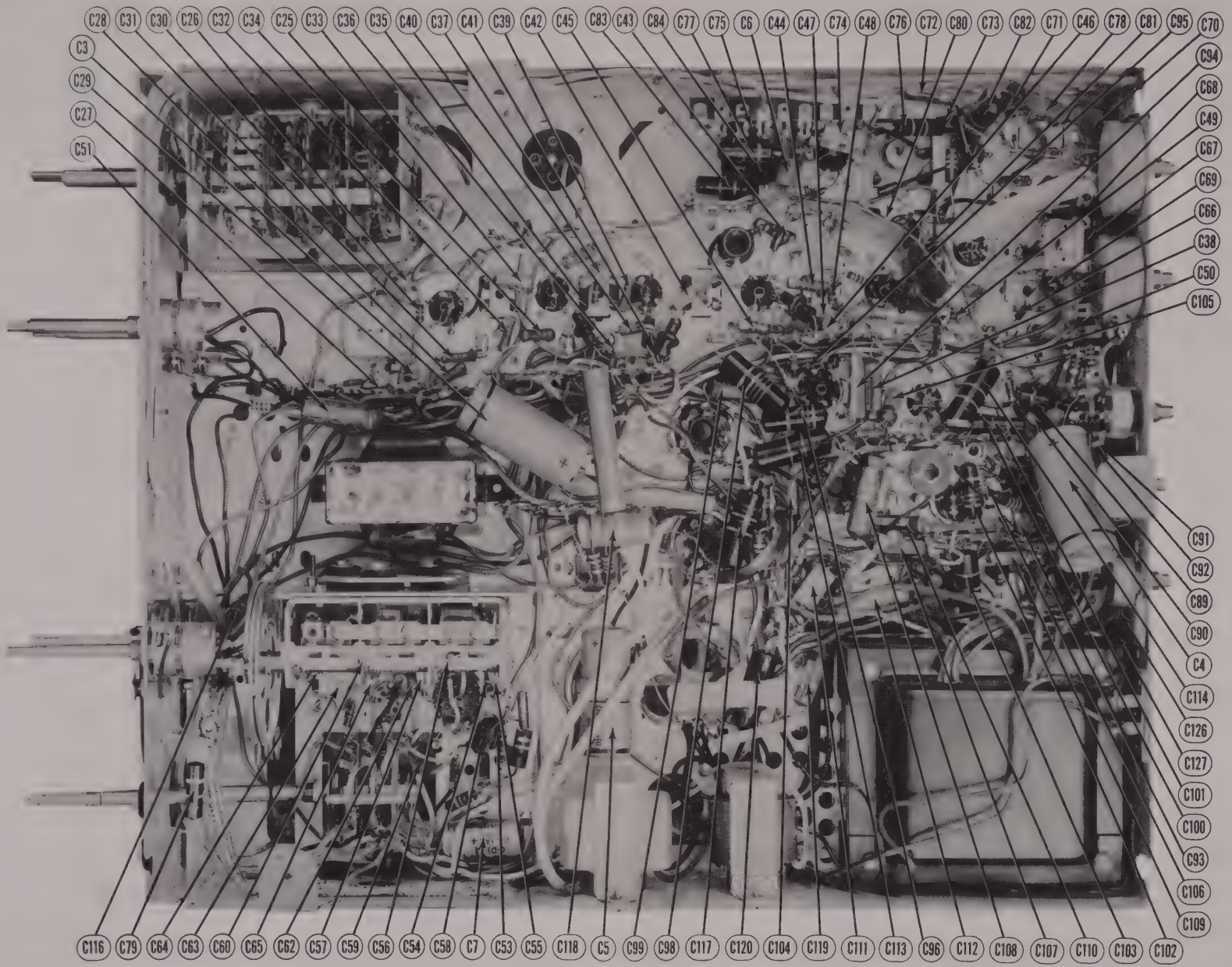
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



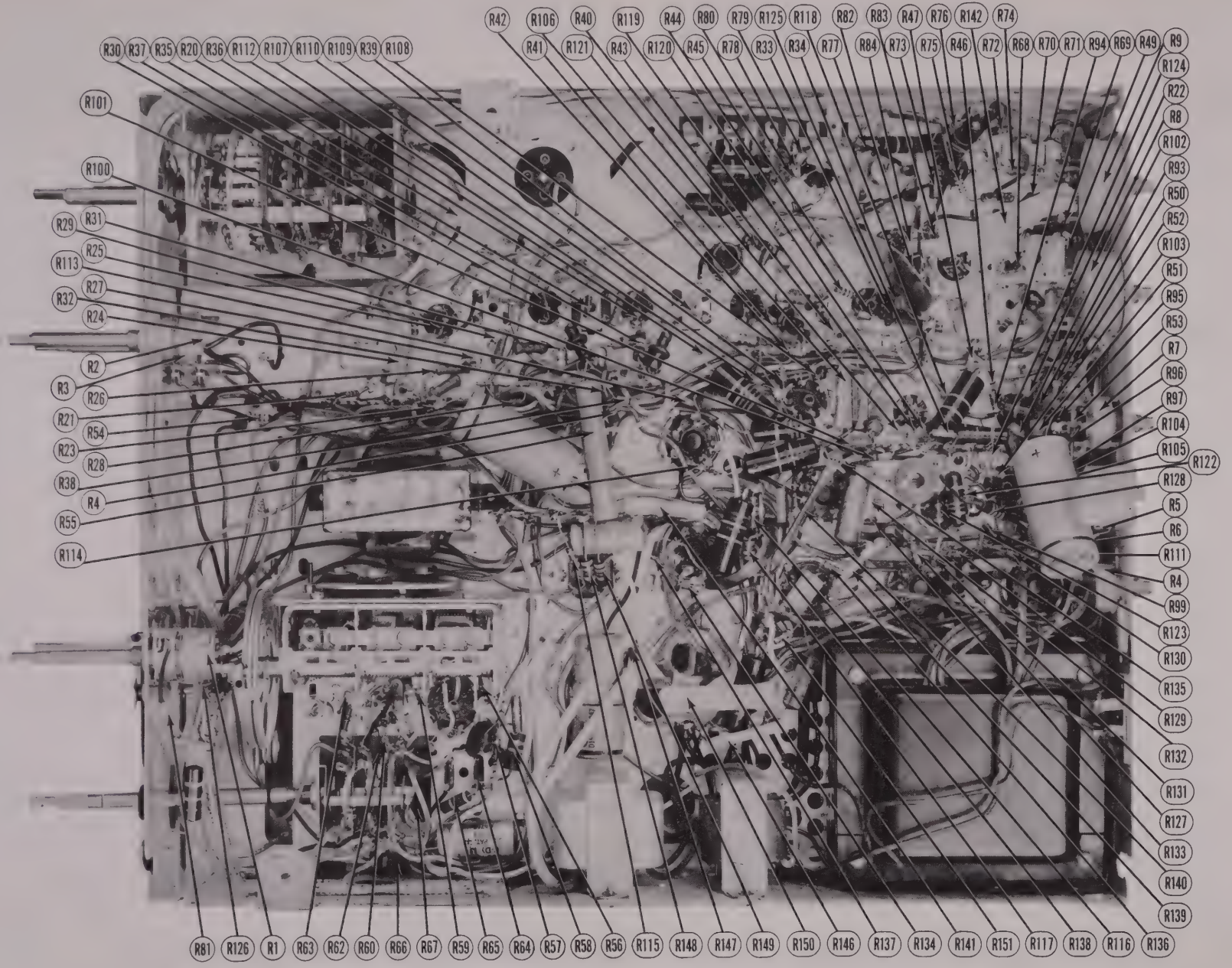
RF TUNER-RIGHT SIDE



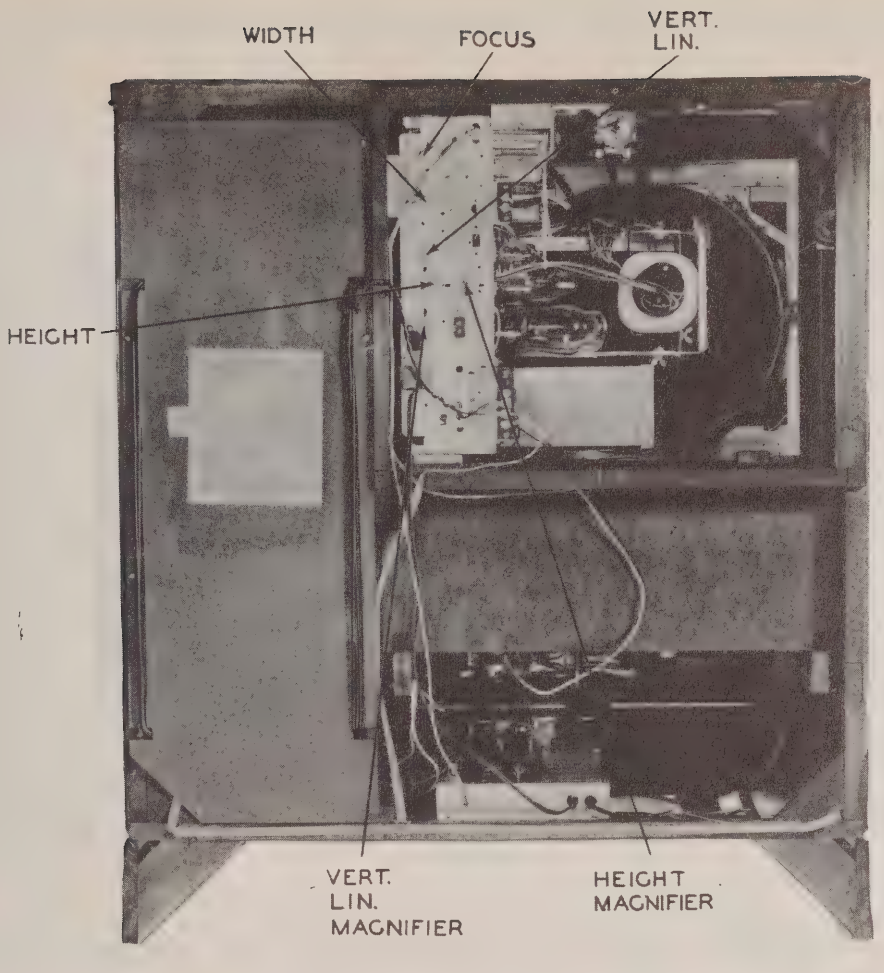
RF TUNER-LEFT SIDE



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



CABINET-REAR VIEW

SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ADJUSTMENT

Turn the set on and tune in a TV station.

Turn the picture expander switch to "large" (clockwise).

Turn the horizontal hold control to the mid position of its range.

Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

HORIZONTAL WIDTH ADJUSTMENT

Turn the picture expander switch to "large" (clockwise), and adjust the horizontal hold control until the picture synchronizes horizontally.

Turn the picture expander switch to "normal" (counter-clockwise), and without touching the hold control turn the width control until the picture synchronizes horizontally and is of proper width.

VERTICAL HEIGHT AND LINEARITY ADJUSTMENTS

Turn the picture expander switch to "normal" (counter-clockwise).

Adjust the height and vertical linearity controls until the picture is of proper height and is symmetrical from top to bottom. These two controls are interacting and will require alternate adjustment to obtain proper results.

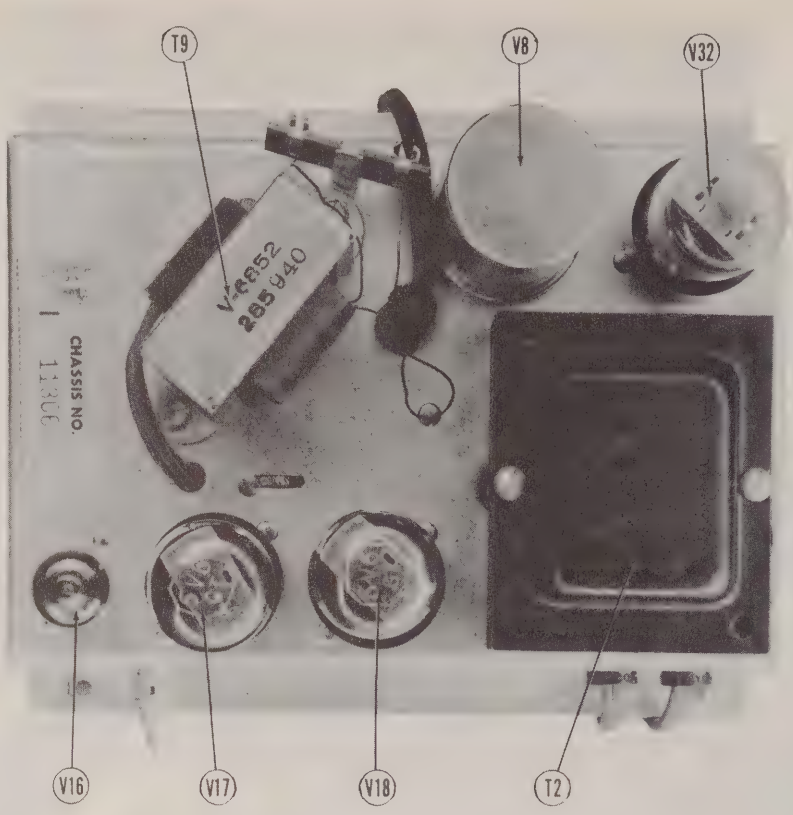
Turn the picture expander to "large". Adjust the vertical linearity magnifier control, and the height magnifier control alternately until the picture is of proper magnified height, and is symmetrical from top to bottom. Each time the "normal" height and linearity controls are changed, the "magnified" controls will require readjustment.

HIGH VOLTAGE OSCILLATOR ADJUSTMENT

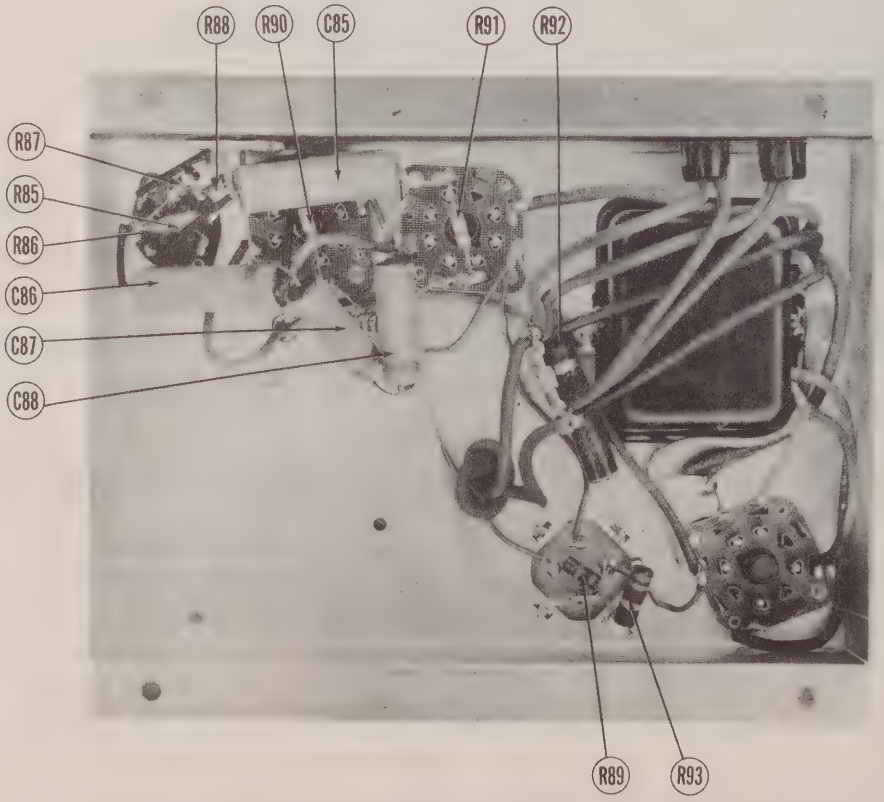
Connect 18 one megohm, one watt resistors in series from the high voltage lead to chassis.

Connect the high voltage multiplier probe of a VTVM to the high voltage lead. Connect the common lead to chassis.

Adjust the high voltage oscillator adjustment trimmer (B2) until the meter reads approximately 9.3 kilovolts.



POWER SUPPLY CHASSIS-TOP VIEW



POWER SUPPLY CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		WESTINGHOUSE PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	6C4	6C4	6BG	
V4	1st Video IF	6BH6	6BH6	7CM	
V5	2nd Video IF	6BH6	6BH6	7CM	
V6	3rd Video IF	6BH6	6BH6	7CM	
V7	4th Video IF	6BJ6	6BJ6	7CM	
V8	AGC Keying	6BH6	6BH6	7CM	
V9	Video Amp.	6AH6	6AH6	7BK	
V10	FM RF Amp. -FM Mixer	12AT7	12AT7	9A	
V11	FM Osc. -AM Conv.	6BE6	6BE6	7CH	
V12	1st Sound IF	6BJ6	6BJ6	7CM	
V13	2nd Sound IF -FM AVC	6BH6	6BH6	7CM	
V14	Ratio Det.	6AL5	6AL5	6BT	
V15	DET. -AVC-AF	6AV6	6AV6	7BT	
V16	Phase Inv.	6C4	6C4	6BG	
V17	Audio Output	6V6GT	6V6GT	7AC	
V18	Audio Output	6V6GT	6V6GT	7AC	
V19	1st Sync. Amp. - Sync. Sep.	12AT7	12AT7	9A	
V20	2nd Sync. Amp. - Phase Inv.	12AU7	12AU7	9A	
V21	Vert. Mult.	12AU7	12AU7	9A	
V22	Vert. Output	6V6GT	6V6GT	7AC	
V23	Hor. AFC	6AL5	6AL5	6BT	
V24	Hor. Mult.	12AU7	12AU7	9A	
V25	Hor. Output	6BQ6GT	6BQ6GT	6AM	
V26	Hor. Output	6BQ6GT	6BQ6GT	6AM	
V27	Damper	6W4GT	6W4GT	4CG	
V28	HV Osc.	6Y6G	6Y6G	7AC	
V29	HV Rectifier	1B3GT	1B3GT	3C	
V30	LV Rectifier	5U4G	5U4G	5T	
V31	LV Rectifier	5U4G	5U4G	5T	
V32	Rectifier	5Y3GT	5Y3GT	5T	
V33	Picture Tube	12KP4A	12KP4A	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	WESTINGHOUSE PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	30	450	V-6978	AF666J			TVL-314	▲ Filter
B	30	450						■ Filter
C	30	450						▲ Filter
C2A	80	400	V-6977	AF16222J			TVL-410	▲ Filter
B	10	400						■ V. Output Screen Bypass
C	10	400						▲ Horiz. MV Decoupling
D	10	400						Decoupling
C3	30	450	V-6570	PRS450/30			TVA-23	Vert. Output Decoupling
C4	30	450	V-6570	PRS450/30			TVA-23	Video Output Decoupling
C5	150	50	V-9009-1	PRS50/100			TVA-16	Vert. Output Cath. Bypass
				PRS50/50			TVA-17	
C6	2	50	V-4880	PRS150/4			TVA-12	Stabilizing Cap.
C7	10	350	V-9351	PRS350/10			TVA-21	Osc. Anode Bypass
C8A	20	400	V-6121	AF444J4A			EL-442	▲ Filter
B	20	400						■ Filter
C	10	350						▲ Decoupling
D	20	25						Output Cathode Bypass
C9	25			GP25K	D6-250	GP1K-25		RF Coupling
C10	680			GP680M	D6-681	GP2K-680		AGC Filter
C11	680			GP680M	D6-681	GP2K-680		RF Screen Bypass
C12	680			GP680M	D6-681	GP2K-680		RF Filament Bypass
C13	25			GP25K	D6-250	GP1K-25		RF Coupling
C14	.47							RF Coupling
C15	.5				D2-.5			RF Coupling
C16	1.5			CN1.5CNPO	D2-1.5	NPOK-1.5		RF Coupling
C17	15			GP15K	D6-150	GP1K-15		RF Coupling
C18	5000			BPD-5	D6-502	811-005	29C1	Mixer Screen Bypass
C19	1.5			CN1.5CNPO	D2-1.5	NPOK-1.5		Osc. Coupling
C20	680			GP680M	D6-681	GP2K-680		Osc. Feedback
C21	3			CN3DN150		N150K-3		Fixed Trimmer
C22	680			GP680M	D6-681	GP2K-680		Osc. Filament Bypass
C23	680			GP680M	D6-681	GP2K-680		RF Bypass
C24	680			GP680M	D6-681	GP2K-680		RF Bypass
C25	5000		V-5596	BPD-5	D6-502	811-005	29C1	Filament Bypass
C26	150	500	RCM20B151K	1468-00015	D6-151	GP2K-150	1FM-315	IF Coupling
C27	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	Mixer Plate Decoupling
C28	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	RF Bypass
C29	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C30	4.7		V-5658-6	CN4.7DNPO	D2-4.7	NPOK-4.7		Fixed Trimmer †
C31	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	1st V. IF Screen Bypass
C32	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	1st V. IF Plate Decoupling
C33	270	500	RCM20B271K	1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C34	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C35	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	2nd V. IF Screen Bypass
C36	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	2nd V. IF Plate Decoupling
C37	270	500	RCM20B271K	1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C38	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	AGC Filter
C39	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	3rd V. IF Cath. Bypass
C40	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	3rd V. IF Screen Bypass
C41	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	3rd V. IF Decoupling
C42	270	500	RCM20B271K	1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C43	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	4th V. IF Cathode Bypass
C44	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	4th V. IF Fil. Bypass
C45	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	4th V. IF Screen Bypass
C46	1500		R5CC26ZY152M	GP1500M	D6-152	GP2L-0015	1FM-215	4th V. IF Decoupling
C47	270	500	RCM20B271K	1468-00025	D6-271	GP2K-270	1FM-325	IF Coupling
C48	4.7		V-5658-6	CN4.7CNPO	D2-4.7	NPOK-4.7	MS-55	Fixed Trimmer
C49	4.7		V-5658-6	GP5K	D2-4.7	NPOK-4.7	MS-55	V. Diode Filter
C50	.1	400	V-6023-4104M	P488-1			TM-1	Video Coupling

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA WESTINGHOUSE PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C51	.1	400	V-6023-4104M	P488-1			TM-1	Plc. Tube Grid Filter
C52	100		R3CC308SLI01M	GP100M	D6-101	GP1K-100	1FM-31	RF Coupling
C53	5000		V-5596	BPD-5	D6-502	811-005	29C1	FM RF Cath. Bypass
C54	470		R5CC21ZY471M	GP470M	D6-471	GP2K-470	1FM-35	AVC Filter
C55	47		R3CC308SL470M	GP47M	D6-470	GP1K-47	1FM-45	RF Coupling
C56	.5		R3CC20SLR50C		D2-.5			RF Coupling
C57	150		R3CC23ZSL151M	GP150M	D6-151	GP2K-150	1FM-315	RF Coupling
C58A	5000		V-9044-1	BPD-5	D6-502	811-005	36C2	FM RF Plate Decoupling
B	[illegible]			BPD-5	D6-502	811-005		AM Conv. Plate Decoupling
C59	[illegible]		V-5596	BPD-5	D6-502	811-005	29C1	FM Mixer Plate Decoupling
C60	1		R3CC20SL1ROC	CN1CNPO	D2-1	NPOK-1.5		Osc. Coupling
C61	470		R5CC21ZY471M	GP470M	D6-471	GP2K-470	1FM-35	RF Coupling
C62	470		R5CC21ZY471M	GP470M	D6-471	GP2K-470	1FM-35	Osc. Anode Bypass
C63	[illegible]		R3CC308SL330M	GP33K	D6-330	GP1K-33	1FM-44	Osc. Grid Cap.
C64	10		R2CC30CK100D	CN10DNPO	D2-10	NPOK-10	MS-41	Fixed Trimmer
C65	68		R3CC308SL680M	GP68K	D6-680	GP1K-68	MS-47	Osc. Grid Cap.
C66	4.7		V-5658-6	CN4.7CNPO	D2-4.7	NPOK-4.7	MS-55	S. IF Coupling
C67	5000		V-5596	BPD-5	D6-502	811-005	29C1	1st S. IF Cathode Bypass
C68A	5000		V-9044-1	BPD-5	D6-502	811-005	36C2	1st S. IF Screen Bypass
B	5000			BPD-5	D6-502	811-005		1st S. IF Plate Decoupling
C69	.022	400	V-6023-4223K	P488-022			TM-12	AVC Filter
C70	[illegible]		V-5596	BPD-5	D6-502	811-005	29C1	AVC Filter
C71	47	500	RCM20B470K	1468-00005	D6-470	GP1K-47	1FM-45	2nd S. IF Grid Filter
C72	100		RCM20B101K	GP100M	D6-101	GP1K-100	1FM-31	Diode RF Filter
C73	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	2nd S. IF Decoupling
C74	680	500	RCM20B681M	1468-00075	D6-681	GP2K-680	1FM-37	Diode Load Cap.
C75	.0022	400	V-6023-6202M	P488-0022	D6-222	GP2M-0022	TM-22	De-emphasis
C76	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	Audio Coupling
C77	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	Audio Coupling
C78	.007	400	RCP10W4702K	P688-0068	D6-682	GP2-334-0068	MB-27	Tone Compensation
C79	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	Tone Compensation
C80	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	Audio Coupling
C81	150	500	RCM20B151K	1468-00015	D6-151	GP2K-150	1FM-315	AF Amp. Plate Bypass
C82	.1	400	V-6023-4104M	P488-1			TM-1	AF Amp. Plate Decoupling
C83	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	Tone Compensation
C84	.047	400	V-6023-4503M	P488-047			TM-15	Audio Coupling
C85	.05	400	V-6023-4503M	P488-05			TM-15	Audio Coupling
C86	.05	400	V-6023-4503M	P488-05			TM-15	Audio Coupling
C87	.001	600	V-6023-6102M	P688-001	D6-102	GP2L-001	TM-21	Output Plate Bypass
C88	.001	600	V-6023-6102M	P688-001	D6-102	GP2L-001	TM-21	Output Plate Bypass
C89	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	Sync. Coupling
C90	390	500	RCM20B39UK	1468-0004	D6-391	GP2K-390	1FM-34	Sync. Coupling
C91	.047	400	V-6023-4103M	P488-047			TM-15	Sync. Coupling
C92	.047	400	V-6023-4103M	P488-047			TM-15	Sync. Coupling †
C93	100	500		1468-0001	D6-101	GP1K-100	1FM-31	2nd Sync. Amp. Plate Bypass †
C94A	2000		*	GP2000M	D6-202	GP2M-002	TM-22	Integrator Net.
B	5000			GP5000M	D6-502	811-005	TM-25	Integrator Net.
C	5000			GP5000M	D6-502	811-005	TM-25	Integrator Net.
C95	.01	400	V-6023-4103K	P488-01	D6-103	811-01	TM-11	Vert. MV Feedback
C96	.047	400	V-6023-4503M	P488-047			TM-15	Vert. MV Cath. Bypass
C97	.1	400	V-6023-4104M	P488-1			TM-1	Vert. MV Grid Bypass †
C98	.068	400	V-6023-4683K	P488-068				Vert. Discharge
C99	.1	400	V-6023-4104M	P488-1			TM-1	Vert. Sweep Coupling
C100	.001	600	V-6023-6102M	P688-001	D6-102	GP2L-001	TM-21	Hor. Sync. Coupling
C101	.001	600	V-6023-6102M	P688-001	D6-102	GP2L-001	TM-21	Hor. Sync. Coupling
C102	.0047	400	V-6023-4472M	P488-0047	D6-472	GP2M-0047	TM-25	AFC Filter
C103	.047	400	V-6023-4503M	P488-047			TM-15	AFC Filter
C104	330	500	RCM20C331J	1468-00035	D6-331	GP2K-330	1FM-335	Hor. Feedback
C105	.0022	600	V-6023-6332M	P688-0022	D6-222	GP2M-0022	TM-22	AFC Filter
C106	330	500	RCM20C331J	1468-00035	D6-331	GP2K-330	1FM-335	Hor. MV Feedback
C107	3900	500	RCM30C392K	1464-004			MS-24	Fixed Trimmer
C108	.1	400	V-6023-4104M	P488-1			TM-1	Hor. MV Plate Decoupling
C109	680	500	RCM20B681M		D6-681	GP2K-680	1FM-37	Hor. Discharge
C110	.01	400	V-6023-4103M	P488-01	D6-103	811-01	TM-11	Hor. Sweep Coupling
C111	270	500	RCM20B470K	1468-00025	D6-271	GP2K-270	1FM-325	Hor. Output Grid Bypass
C112	.1	400	V-6023-4104M	P488-1			TM-1	Hor. Output Cath. Bypass
C113	.1	400	V-6023-4104M	P488-1			TM-1	Hor. Output Screen Bypass
C114	.1	400	V-6023-4104M	P488-1			TM-1	Switch Bypass †
C115	.1	400	V-6023-4104M	P488-1			TM-1	Hor. Output Plate Dec. †
C116	.1	400	V-6023-4104M	P488-1			TM-1	Vert. MV Plate Decoupling
C117	.1	400	V-6023-4104M	P488-1			TM-1	Hor. Sweep Coupling
C118	.35	400	V-6066-4254M	P488-25			TC-2	Hor. Damper Plate Bypass
C119	.022	400		P488-022			TM-12	RF Bypass †
C120	.1	400	V-6023-4104M	P488-1			TM-1	HV Osc. Decoupling †
C121	.047	400	V-6023-4503M	P488-047			TM-15	HV Osc. Screen Bypass
C122	.047	400	V-6023-4503M	P488-047			TM-15	HV Osc. Plate Decoupling
C123	270	500	RCM20B271K	1468-00025	D6-271	GP2K-270	1FM-325	HV Osc. Grid Cap.
C124	500	10000	V-5895					HV Filter
C125	500	10000	V-5895					HV Filter
C126	.01	600	V-5040-15	P688-01	D6-103	811-01	TM-11	Line Filter
C127	.01	600	V-5040-15	P688-01	D6-103	811-01	TM-11	Line Filter

* Items C94A, C94B, C94C, R106A, R106B, and R106C are combined into one unit, obtainable under MFGR'S Part No. V-9213.
† Not used in all models.
‡ Some models use 390MMF in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WESTING. PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	2 Meg.			B13-139X *			Volume control-front-tapped at 500KΩ
B	1 Meg.		V-9385-1	B17-137 *		SBBT-512-S	Tone control -rear
C	Shaft End			E-202 *			Attach per instructions in "Concentrikit".
D	Switch			76-1 *			Attach per instructions in "Concentrikit".
R2A	50KΩ						Brightness control-front
B	1500Ω		V-9235-2		V-9235-2	SBB-513	Contrast control-rear
R3A	500KΩ			B11-133 *			Vert. hold control-front
B	100KΩ		V-9377-1	B11-128 *		SBB-514	Horiz. hold control-rear
C	Shaft End			E-202 *			Attach per instructions in "Concentrikit".
R4A	25KΩ	½	V-5910	Q11-120	AM-40-S	AN-26	Vert. linearity magnifier control
B	Shaft		Not Req.	RQ	KSS-3 #	AK-1	Attach to R4A per instructions
R5A	1 Meg.	½	V-6462	Q11-137	AM-61-S	AN-69	Height control
B	Shaft		Not Req.	RQ	KSS-3 #	AK-1	Attach to R5A per instructions
R6A	2.5 Meg.	½	V-5909	Q11-239	AM-84-S	AN-83	Height magnifier control
B	Shaft		Not Req.	RQ	KSS-3 #	AK-1	Attach to R6A per instructions

CONTROLS (CONT.)

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R7A	5000Ω	½	V-6463	Q11-114	AM-19-S	AN-10	Vert. linearity control
B	Shaft		Not Req.	RQ	KSS-3 #	AK-1	Attach to R7A per instructions
R8	5000Ω	4	V-6500-1		10-5000 #	V-135 #	Width control-Wire Wound
R9	400Ω	4	V-5908		10-400 #	V-126 #	Focus control-Wire Wound

* Additional parts to be used with "Concentrikit".
# File slot in shaft to duplicate original.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WESTINGHOUSE PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED
R10	1000Ω	½		BTS-1000	RF Grid
R11	1000Ω 20%	½		BTS-1000	RF Screen
R12	10KΩ	1			RF Plate
R13	18KΩ	½		BTS-18K	RF Plate Coil Shunt
R14	4700Ω	½		BTS-4700	Mixer Grid Coil Shunt
R15	1 Meg. 20%	½			Mixer Grid
R16	82KΩ	½			Mixer Screen
R17	22KΩ 20%	½			Osc. Grid
R18	470Ω 20%	½			Osc. Cathode
R19	6800Ω 20%	1			Osc. Plate
R20	20000Ω	5	V-6984-1	AB-2000	Decoupling-Wire Wound
R21	1000Ω 20%	½	RC20AE102M	BTS-1000	Mixer Plate Decoupling
R22	22KΩ	½	RC20AE223K	BTS-22K	Voltage Divider
R23	10KΩ	½	RC20AE103K	BTS-10K	AGC Network
R24	12KΩ	½	RC20AE123K	BTS-12K	1st Video IF Grid
R25	100Ω	½	RC20AE101K		1st Video IF Cathode
R26	1000Ω 20%	½	RC20AE102M	BTS-1000	1st Video IF Screen Decoupling
R27	1000Ω 20%	½	RC20AE102M	BTS-1000	1st Video IF Plate Decoupling
R28	10KΩ 20%	½	RC20AE103M	BTS-10K	AGC Network
R29	10KΩ	½	RC20AE103K	BTS-10K	2nd Video IF Grid
R30	100Ω	½	RC20AE101K		2nd Video IF Cathode
R31	1000Ω 20%	½	RC20AE102M	BTS-1000	2nd Video IF Screen Decoupling
R32	1000Ω 20%	½	RC20AE102M	BTS-1000	2nd Video IF Plate Decoupling
R33	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg.	AGC Network
R34	220KΩ	1	RC30AE224K	BTA-220K	AGC Keying Plate Load
R35	68KΩ	½	RC20AE682K		3rd Video IF Coil Shunt
R36	68Ω	½	RC20AE680K		3rd Video IF Cathode
R37	100KΩ	1	RC30AE104K		3rd Video IF Screen
R38	1000Ω 20%	½	RC20AE102M	BTS-1000	3rd Video IF Decoupling
R39	4700Ω	½	RC20AE472K	BTS-4700	4th Video IF Coil Shunt
R40	68Ω	½	RC20AE680K		4th Video IF Cathode
R41	47KΩ	1	RC30AE473K	BTA-47K	4th Video IF Screen
R42	1000Ω 20%	½	RC20AE102M	BTS-1000	4th Video IF Decoupling
R43	4700Ω	½	RC20AE472K	BTS-4700	AGC Keying Grid
R44	47KΩ	½	RC20AE473K	BTS-47K	AGC Keying Cathode
R45	10KΩ	½	RC20AE103K	BTS-10K	Voltage Divider
R46	10KΩ	½	RC20AE103K	BTS-10K	Voltage Divider
R47	4700Ω	½	RC20AE472K	BTS-4700	Video Det. Load
R48	10MΩ	1	RC30AE683K	BTA-68K	Video Amp. Screen
R49	22KΩ	½	RC20AE223K	BTS-22K	Peaking Coil Shunt
R50	3600Ω 5%	1	RC30AE362J		Video Amp. Plate
R51	10KΩ	2	RC41AE103K	BT-2-10K	Video Amp. Plate Decoupling
R52	47KΩ	½	RC20AE473K	BTS-47K	Voltage Divider
R53	68KΩ	½	RC20AE683K	BTS-68K	Picture Tube Cathode
R54	47KΩ	½	RC20AE473K	BTS-47K	Voltage Divider
R55	3000Ω	20	V-9375-1	DG-3000	Filter-Wire Wound
R56	15Ω 20%	½	RC10AE150M		Parasitic Supp.
R57	82Ω	½	RC10AE820K		FM RF Cathode
R58	10KΩ	½	RC40AE103K		FM RF Plate Decoupling
R59	470KΩ 20%	½	RC10AE474M	BTS-470K	FM Mixer Grid
R60	1000Ω	½	RC10AE102K	BTS-1000	FM Mixer Plate Decoupling
R61	2200Ω 20%	½	RC20AE222K	BTS-2200	AM Ant. Shunt
R62	33Ω	½	RC10AE330K		Parasitic Supp.
R63	22KΩ	½	RC10AE223K	BTS-22K	Osc. Grid
R64	15KΩ	½	RC20AE153K	BTS-15K	AM Conv. Plate Decoupling
R65	47KΩ	1	RC30AE473K		Osc. Anode
R66	22KΩ	2	RC40AE223K		Osc. Anode
R67	1 Meg. 20%	½	RC10AE105M	BTS-1 Meg.	AVC Network
R68	100Ω	½	RC20AE101K		1st Sound IF Cathode
R69	47KΩ	1	RC30AE473K	BTA-47K	1st Sound IF Screen
R70	5600Ω	1	RC30AE562K		1st Sound IF Plate Decoupling
R71	1 Meg.	½	RC20AE105K	BTS-1 Meg.	AVC Network
R72	100KΩ	½	RC20AE104K	BTS-100K	2nd Sound IF Grid
R73	68KΩ	1	RC30AE683K		2nd Sound IF Decoupling
R74	1 Meg.	½	RC20AE105K	BTS-1 Meg.	AVC Network
R75	47KΩ	½	RC20AE473K	BTS-47K	Diode Filter
R76	470KΩ	½	RC20AE474K	BTS-470K	Diode Load
R77	100Ω	½	RC20AE101K		Balancing
R78	33KΩ	½	RC20AE333K	BTS-33K	De-emphasis
R79	6800Ω 5%	½	RC20AE682J	BTS-6800-5%	Ratio Det. Diode Load
R80	6800Ω 5%	½	RC20AE682J	BTS-6800-5%	Ratio Det. Diode Load
R81	22KΩ	½	RC20AE223K	BTS-22K	Tone Compensation
R82	10 Meg. 20%	½	RC20AE106M	BTS-10 Meg.	AF Amp. Grid
R83	470KΩ	½	RC20AE474K	BTS-470K	AF Amp. Plate
R84	150KΩ	½	RC20AE154K	BTS-150K	AF Amp. Plate Decoupling
R85	470KΩ 20%	½	RC20AE474M	BTS-470K	Phase Inv. Grid
R86	3000Ω 20%	½	RC20AE302M	BTS-3300	Phase Inv. Cathode
R87	47KΩ	½	RC20AE473K	BTS-47K	Phase Inv. Cathode
R88	47KΩ	½	RC20AE473K	BTS-47K	Phase Inv. Plate
R89	10KΩ	½	RC20AE103K	BTS-10K	Phase Inv. Plate Decoupling
R90	470KΩ 20%	½	RC20AE474M	BTS-470K	Output Grid
R91	470KΩ 20%	½	RC20AE474M	BTS-470K	Output Grid
R92	200Ω	2		BW-2-220	Output Cathode
R93	6800Ω	1	RC30AE682K	BTA-6800	Filter
R94	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Voltage Divider
R95	470KΩ	½	RC20AE474K	BTS-470K	Charge Limiting
R96	1 Meg.	½	RC20AE105K	BTS-1 Meg.	Sync. Sep. Grid
R97	150KΩ	½	RC20AE154K	BTS-150K	Sync. Sep. Plate
R98	22KΩ	½	RC20AE223K	BTS-22K	Voltage Divider
R99	1 Meg.	½	RC20AE105K	BTS-1 Meg.	2nd Sync. Amp. Grid
R100	10000Ω 20%	½	RC20AE102M	BTS-1000	2nd Sync. Amp. Cathode
R101	330Ω	½	RC20AE331K	BW-½-330	2nd Sync. Amp. Cathode
R102	15KΩ	½	RC20AE153K	BTS-15K	2nd Sync. Amp. Plate
R103	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg.	Sync. Phase Inv. Grid
R104	2700Ω	½	RC20AE272K	BTS-2700	Sync. Phase Inv. Cathode
R105	2700Ω	½	RC20AE272K	BTS-2700	Sync. Phase Inv. Plate

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA WESTINGHOUSE PART No.	IRC PART No.	IDENTIFICATION CODES
R106A	22KΩ	½		BTS-22K	Integrator Network-See Note 1
B	8200Ω	½		BTS-8200	Integrator Network-See Note 1
C	8200Ω	½		BTS-8200	Integrator Network-See Note 1
R107	1000Ω	½	RC20AE102K	BTS-1000	Vert. MV Cathode
R108	100KΩ	½	RC20AE104K	BTS-100K	Vert. MV Plate
R109	470KΩ	½	RC20AE474K	BTS-470K	Vert. MV Grid
R110	390KΩ 5%	½	RC20AE394J	BTS-390K-5%	Vert. MV Plate
R111	47KΩ	½	RC20AE473K	BTS-47K	Vert. MV Plate Decoupling
R112	4700Ω	½	RC20AE472K	BTS-4700	Vert. Peaking
R113	2.2 Meg.	½	RC30AE225K	BTS-2.2 Meg.	Vert. Output Grid
R114	470Ω	½	RC20AE471K	BTS-470	Vert. Output Cathode
R115	470Ω	½	RC20AE471K	BTS-470	Vert. Output Decoupling
R116	220KΩ	1	RC30AE224K	BTA-220K	Feedback Network
R117	220KΩ	1	RC30AE224K	BTA-220K	Feedback Network
R118	68KΩ	½	RC20AE683K	BTS-68K	Horiz. AFC Load
R119	100KΩ 5%	½	RC20AE104J	BTS-100K-5%	Horiz. AFC Load
R120	100KΩ 5%	½	RC20AE104J	BTS-100K-5%	Horiz. AFC Load
R121	4.7 Meg. 20%	½	RC20AE475M	BTS-4.7 Meg.	Horiz. AFC Load
R122	470KΩ	½	RC20AE474K	BTS-470K	Horiz. AFC Filter Network
R123	100Ω	½	RC20AE101K		Horiz. MV Cathode
R124	1800Ω	½	RC20AE182K	BTS-1800	Horiz. MV Cathode
R125	220KΩ 5%	½	RC20AE224J	BTS-220K-5%	Horiz. MV Grid
R126	27KΩ	½	RC20AE273K	BTS-27K	Horiz. MV Grid
R127	5600Ω	½	RC20AE562K	BTS-5600	Horiz. MV Plate
R128	33KΩ	1	RC30AE333K	BTA-33K	Horiz. MV Plate Decoupling-See Note 2
R129	220KΩ	½	RC20AE224K	BTS-220K	Horiz. MV Plate
R130	10KΩ	½	RC20AE103K	BTS-10K	Horiz. MV Plate Decoupling
R131	27KΩ	½	RC20AE273K	BTS-27K	Horiz. Peaking
R132	120Ω	½	RC20AE121K		Parasitic Supp.
R133	100KΩ	½	RC20AE104K	BTS-100K	Horiz. Output Grid
R134	33Ω 20%	½	RC20AE330M		Parasitic Supp.
R135	33Ω 20%	½	RC20AE330M		Parasitic Supp.
R136	120Ω	½	RC20AE121K		Parasitic Supp.
R137	33Ω 20%	½	RC20AE330M		Parasitic Supp.
R138	33Ω 20%	½	RC20AE330M		Parasitic Supp.
R139	150Ω	5		AB-150	Horiz. Output Cathode-Wire Wound
R140	10KΩ	5	V-6984-5	AB-10,000	Horiz. Output Screen-Wire Wound
R141	2000Ω	5	V-6984-1	AB-2000	Horiz. Damper Plate-Wire Wound
R142	110Ω	5	V-4758		Focus Coil Shunt-Wire Wound
R143	68KΩ	½	RC30AE683K	BTS-68K	HV Osc. Grid
R144	33KΩ	1	RC41AE333K	BTA-33K	HV Osc. Screen-See Note 3
R145	68Ω	½	RC20AE680K		Parasitic Supp.
R146	560Ω	5	V-6984-6		HV Osc. Decoupling-Wire Wound
R147	3300Ω	1	RC30AE332K	BTA-3300	Voltage Divider
R148	3300Ω	1	RC30AE332K	BTA-3300	Voltage Divider
R149	3300Ω	1	RC30AE332K	BTA-3300	Voltage Divider
R150	2450Ω	10	V-9085-3		Filter-Wire Wound
R151	100Ω	½	RC20AE101K	BW-½-100	Power Supply Protection
R152	100KΩ	½	RC20AE104K		HV Filter

Note 1. Items C94A, C94B, C94C, R106A, R106B and R106C are combined into one unit obtainable under MFGR'S Part No. V-9213.
Note 2. Some models use 10KΩ resistor in this application.
Note 3. Some models use 68KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	660VCT	5VAC	12.6VCT	V-6988	P-8156 ②	P-3061	TP-365
	② 2.15A	.270ADC	② 6A	② 5A				
T2	117VAC	620VCT	5VAC	6.3VAC	V-6851	P-6011 ②	P-2951	PH-70B
	② .55A	.077ADC	② 2A	② 1A				

② Add series resistor to reduce plate voltage.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T3	117VAC	6.3VAC			V-6481-2	P-6134 ①	P-2945	FO-6
	② 1A	② 1.2A						

① Drill one new mounting hole.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA WESTINGHOUSE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T4	440Ω		V-9230-2				Hor. Choke
T5	650Ω	12.5Ω	V-6981-2	A-8112 ②	A-3036 ②	TSO-5	Vert. Output Trans.
T6A	36Ω		V-6486-2				Hor. Deflection Coil
B	65Ω						Vert. Deflection Coil
T7	250Ω		V-5900-2	FC-10	MF-3		Focus Coil
T8	2Ω	700Ω	V-9280-3				High Voltage Trans.
		SEC. 2					
		0Ω					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA WESTING. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T9	7.6KΩ CT	4Ω	300Ω CT	.4Ω	V-6852	A-3852	A-2936	RO-305	

WESTINGHOUSE MODELS H-603C12, H-608C12 (Ch. V-2152-01 and V-2149-3)

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	WESTINGHOUSE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	4Ω	V-9335	ST-120 MOD. P10-S③	10A31	③ Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	V. C. DIA.				
SP2	9 1/4"	1"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ↶)	WESTING. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.270A	41.5Ω	1.4 Henry	V-6471	C-2326 ■	C-2996 ▲		▲ Drill one new mounting hole. ■ Cut tips off feet and file slots.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	WESTINGHOUSE PART No.	MEISSNER PART No.	
L2	Ant. Trans.	.1Ω	.1Ω			Part of tuner
L3	Fil. Choke	.1Ω				Part of tuner
L4	Fil. Choke	.1Ω				Part of tuner
L5	Fil. Choke	.1Ω				
L6	1st Video IF	.2Ω		V-9231		
L7	2nd Video IF	.5Ω		V-6459		
L8	RF Choke	3.5Ω		V-5902-7		
L9	3rd Video IF	.5Ω		V-6459		
L10	RF Choke	3.5Ω		V-5902-7		
L11	4th Video IF	.5Ω		V-6459		
L12	4th Video IF Cath. Trap	.5Ω	.5Ω	V-5899		
L13	Peaking	3.5Ω		V-5902-7		
L14	5th Video IF	.5Ω		V-6459		
L15	Peaking	5Ω		V-5902-4		
L16	Peaking	5.7Ω		V-5902-1		
L17	Peaking	8Ω		V-5902-5		
L18	FM RF Coil	0Ω		V-9317-2		
L19	FM Mixer	0Ω		V-9355		
L20	FM Osc.	0Ω		V-9353		
L21	RF Choke	2Ω		V-4886-4		
L22	RF Choke	1Ω		V-4886-10		
L23	Parasitic Supp.	0Ω		V-4886-7		Wound on 22Ω resistor
L24	Loop Ant.	.1Ω		V-5982-2		
L25	AM Ant. Loading	2Ω		V-6157		White identification dot.
L26	AM Osc.	9Ω		V-9352		Tapped at .2Ω
L27	Fil. Choke	0Ω		V-4886-2		
L28	1st FM IF	2.5Ω	2.3Ω	V-9371		
L29	1st AM IF	17.6Ω	17.6Ω	V-6130-1		
L30	2nd FM IF	2.5Ω	2.5Ω	V-9370		
L31	2nd AM IF	17.5Ω	17.5Ω	V-6130-2		
L32	Ratio Det. Trans.	8Ω	1Ω	V-9340		
L33	Ringing	105Ω		V-6764		
L34	Fil. Choke	0Ω		V-4886-2		Red identification dot.
L35	RF Choke	23Ω		V-9279-1		
L36	Fil. Choke	.2Ω		V-4886-1		
L37	Fil. Choke	.2Ω		V-9099-1		
L38	Fil. Choke	.2Ω		V-9099-1		
L39	Fil. Choke	.2Ω		V-9099-1		
L40	Fil. Choke	.2Ω		V-9099-1		
L41	Fil. Choke	.2Ω		V-9099-1		
L42	Fil. Choke	.2Ω		V-9099-1		

PHONO CARTRIDGE and NEEDLE

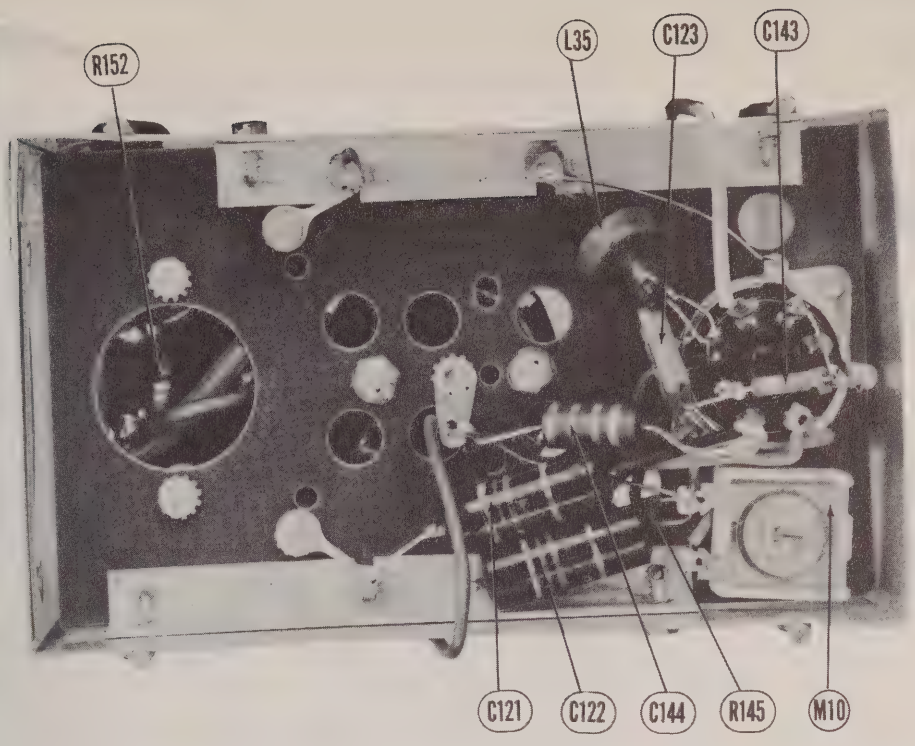
ITEM No.	REPLACEMENT DATA					REMARKS
	WESTINGHOUSE PART No.	ASTATIC PART No.		SHURE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		ACD-J	"C"			

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA	NOTES
					WESTINGHOUSE PART No.	
M2	Bayonet	6-8	.25	Blue	44	Type #44

MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
M3	RF Tuner	V-8209	
M4	Crystal	V-6962-1	1N34 Video Det.
M5	Switch	V-9295	Phono-AM-FM-TV-UHF
M6	Switch	V-6986	Magnifier
M7	Tuning Cap.	V-9349	AM-FM
M8	FM Dipole	V-5986-2	
M9	TV Antenna	V-9455-1	
M10	Trimmer	V-6454	HV Osc.
M11	Trimmer	V-9398	4.5 MC Trap
	Knob	V-9333-1	Door, Mahogany
	Knob	V-9333-2	Door, Blonde
	Knob	V-6146-1	Contrast, Tone, Horiz. Hold, On-Off Mahogany
	Knob	V-6146-6	Contrast, Tone Horiz. Hold, On-Off Blonde
	Knob	V-9104-3	Picture Expander, Rear
	Knob	V-9104-2	AM-FM Tuning, Rear
	Knob	V-9104-1	Brightness, Vol., Vert. Hold
	Knob	V-9104-4	Fine Tuning
	Knob	V-6284-2	Ch. Sel., Band Sel., Picture Expander Mahogany
	Knob	V-6284-3	Ch. Sel., Band Sel., Picture Expander Blonde
	Knob	V-5698-2	TV Antenna Mahogany
	Knob	V-5698-1	TV Antenna Blonde



HIGH VOLTAGE SUPPLY— BOTTOM VIEW

DISASSEMBLY INSTRUCTIONS

TV CHASSIS

1. Remove twelve push-on type control knobs.
2. Remove eight screws holding rear cover and remove.
3. Disconnect power and phono plugs from TV chassis.
4. Disconnect three built-in antenna leads at screw connections.
5. Disconnect amplifier plug from chassis.
6. Remove screw holding dial lamp and pull lead through hole in cabinet.
7. Remove six screws holding antenna dial system at top of cabinet and remove.
8. Remove antenna tuning knob at front and push shaft to rear and remove.
9. Remove two screws holding upper chassis bracket. Remove two 7/16" hex head bolts holding chassis at bottom.
10. Remove bracket holding picture tube frame. Remove chassis.

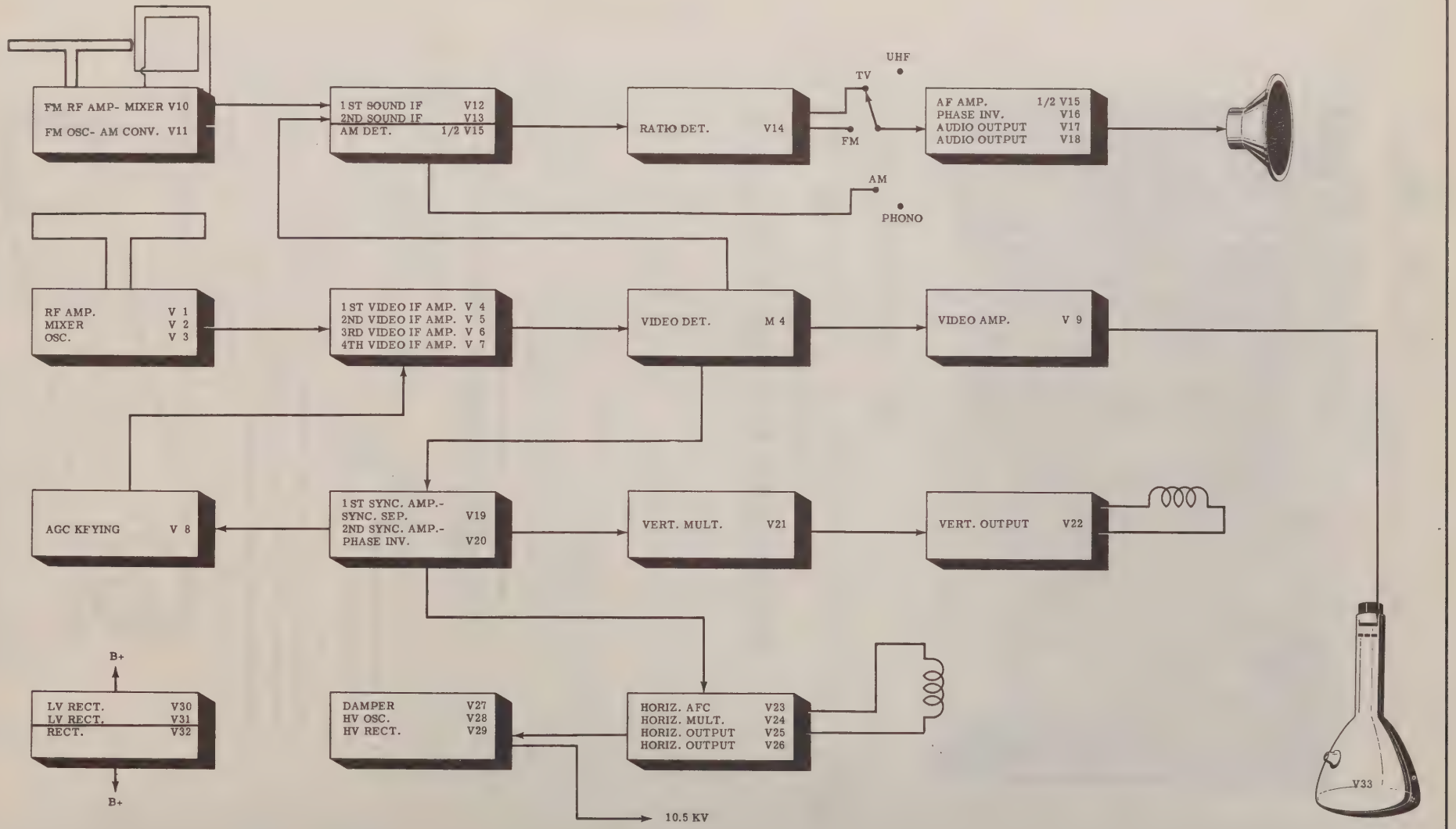
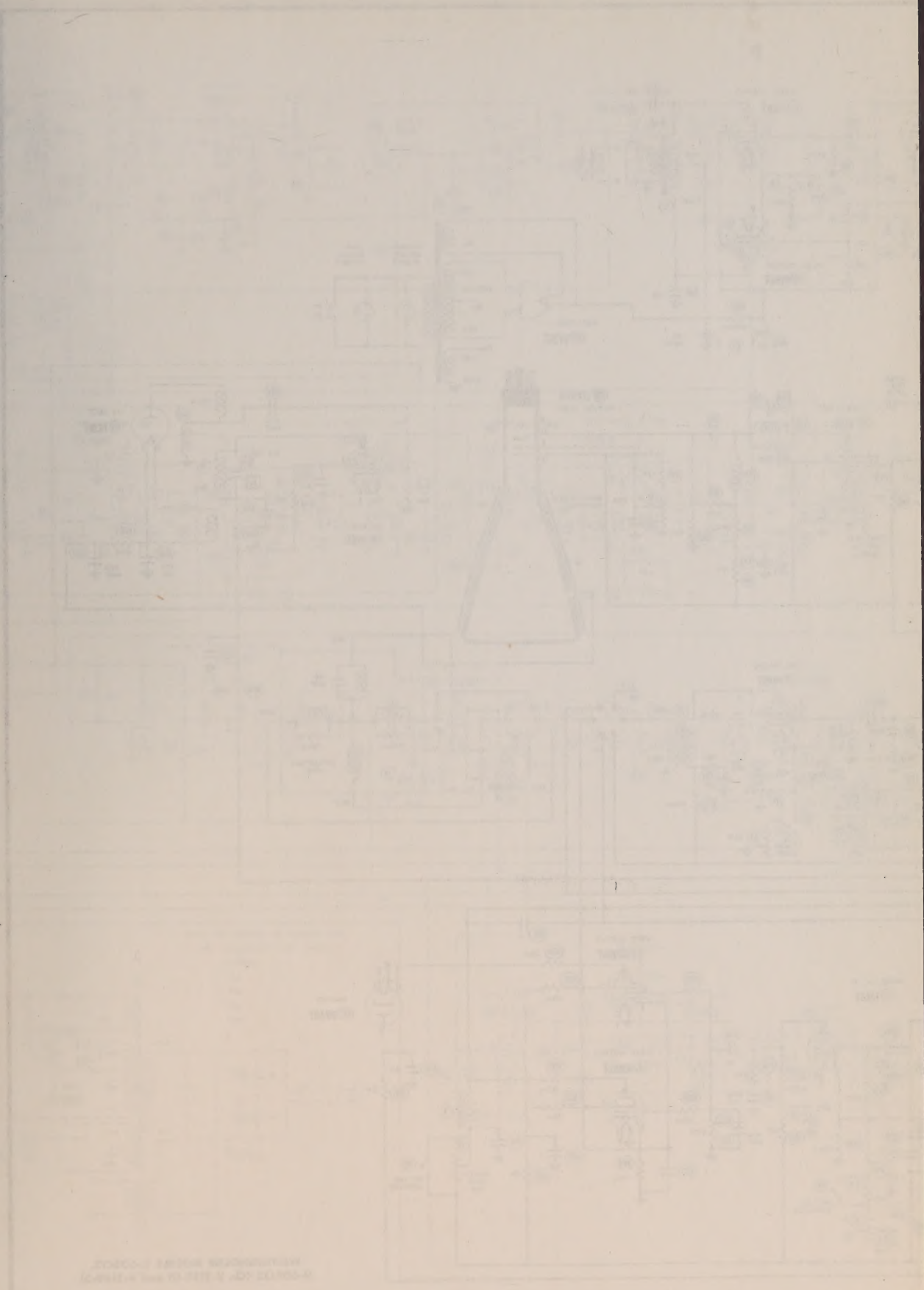
AMPLIFIER CHASSIS

1. Disconnect amplifier and speaker plugs from chassis.
2. Disconnect phono power plug at phono connection.
3. Remove four screws holding amp chassis an remove.

SPEAKER

1. Remove four screws holding bottom phono cover. Remove cover.
2. Remove seven screws holding screen type speaker cover. Remove cover.
3. Remove four screws holding speaker. Remove speaker.

ANTENNA DRIVE CORD STRINGING



BLOCK DIAGRAM